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Be/X-ray stars and candidates: catalogue

S.B. Popov[1,2] and N.V. Raguzova[1]

[1] Sternberg Astronomical Institute, Universitetski pr. 13, 119992 Moscow, Russia
e-mail: polar@sai.msu.ru; raguzova@sai.msu.ru
[2] Università di Padova, Dipartimento di Fisica, via Marzolo 8, 35131, Padova, Italy
e-mail: popov@pd.infn.it

Abstract. Here we present a compilation of data on Be/X-ray binaries. On the whole we include 90 objects into our catalogue. Brief comments on each object are provided.

Key words. Catalogs – X-rays: binaries – stars: emission-line, Be

1. Introduction

Among massive X-ray binaries (HMXBs) most numerous are systems where optical companions are Be-stars. The latest catalogue of HMXBs was presented by Liu, van Paradijs & van den Heuvel (2000). However, as far as Be/X-ray systems are a subject of particular interest it is reasonable to make a separate list of these sources. Such lists appear more or less regularly (see one of the latest one in Ziolkowski 2002). In this paper we try to collect a more extended catalogue and provide some brief comments on every source [1].

2. The catalogue

In the tables below we present a compilative catalogue of Be/X-ray stars. In the first column we give sources names. If possible the first name corresponds to notation in Liu, van Paradijs & van den Heuvel (2000). In the second and third columns we present spectral type of the massive companion and its magnitude. In the forth column we give spin period, and in the fifth — orbital period. Then we give orbital eccentricity and distance to the source. In the 8th column we give $L_{\max}$ – the maximal observed luminosity. In the last column pulse fractions are given. Some comments and more detailed description about each object can be found in subsection ”Comments to the tables” below. References in the tables are given in square brackets (in few cases we do not follow the data up to the first determination of a parameter, but give a reference to some catalogue).

References for the table:
(1) Laycock et al. (2002); (2) Haberl & Sasaki (2000); (3) Ueno et al. (2000a); (4) Yokogawa & Koyama (1998a); (5) Yokogawa et al. (1999); (6) Ueno et al. (2000b); (7) Yokogawa et al. (2000b); (8) Liu, van Paradijs & van den Heuvel (2000); (9) Marshall et al. (1997); (10) Li, Jernigan & Clark (1977); (11) Coe et al. (2002); (12) Imanishi et al. (1999); (13) Stevens et al. (1999); (14) Israel et al. (1995); (15) Yokogawa et al. (2000c); (16) Laycock et al. (2003); (17) Corbet, Marshall & Markwardt (2001); (18) Covino et al. (2001); (19) Cowley et al. (1997); (20) Yokogawa et al. (2003); (21) Lochner (1998); (22) Murdin et al. (1979); (23) Corbet & Marshall (2000); (24) Ziolkowski (2002); (25) Jeong (2003); (26) Harmanec et al. (2000); (27) Perrymann et al. (1997); (28) Lochner et al. (1999); (29) Yokogawa et al. (2000d); (30) Torii et al. (2000); (31) Edge & Coe (2003); (32) Sasaki, Pietch & Haberl (2003); (33) Kohno, Yokogawa & Koyama (2000); (34) Macomb et al. (2003); (35) Sasaki et al. (2001); (36) Yokogawa et al. (2000a); (37) Hughes & Smith (1994); (38) Yokogawa et al. (2003); (39) Negueruela & Okazaki (2001a); (40) Soria (1999); (41) Macomb et al. (1998); (42) Reig et al. (2000); (43) Hutchings & Crampton (1981); (44) Negueruela et al. (1999); (45) Delgado-Marti et al. (2001); (46) Negueruela & Coe (2002); (47) Burderi et al. (1998); (48) Negueruela et al. (2000); (49) Borkus et al. (1998); (50) Frontera et al. (1985). (51) in’t Zand et al. (2001a); (52) Paul et al. (2001); (53) Takeshima et al. (1998); (54) Kinugasa et al. (1998); (55) Wilson et al. (1997b); (56) Petre & Gehrels (1994); (57) Reig & Roche (1999b); (58) Wilson et al. (1999a); (59) Kaaret et al. (1999); (60) Cusumano et al. (2000); (61) Wilson et al. (1999b); (62) Corbet & Peele (1997); (63) in’t Zand et al. (2001b); (64) Wilson et al. (2003); (65) Israel et al. (2001); (66) Wilson et al. (1997b); (67) Piraino et al. (2000); (68) Reig et al. (2001); (69) Reig & Roche (1999a); (70) Harmon et al. (2004) (71) Oosterbroek et al. (1999); (72) Kelley et al. (1983); (73)

Send offprint requests to: N. Raguzova

[1] This catalogue is appearing only in the ArXiv and should be refered only by its astro-ph number. Comments are welcomed.

Torii et al. (1999); (74) Smith et al. (1998); (75) Motch et al. (1997); (76) Schmidtke et al. (1999); (77) Edge et al. (2004); (78) Torii et al. (1998); (79) Reig et al. (2001); (80) Israel et al. (2000).

2.1. Comments to the tables

Here we present comments to the tables.

XTE SMC95. The source has been revealed during RXTE observations of the Small Magellanic Cloud, the pulsar was detected in three Proportional Counter Array (PCA) observations during an outburst (Laycock et al. 2002). The source is proposed to be a Be/neutron star system on the basis of its pulsations, transient nature and characteristicaly hard X-ray spectrum. The 2-10 keV X-ray luminosity implied by observations is $\gtrsim 2 \cdot 10^{37}$ erg s^{-1}. Laycock et al. (2002) give the following best fit position: $\alpha = 13.36°$, $\delta = -72.821°$.

J0032.9-7348. (RX J0032.9-7348) This source was discovered by Kahabka & Pietch (1996) in ROSAT pointed observations made in 1992 December and 1993 April. Stevens et al. (1999) identified two Be stars within PSPC error circle of RX J0032.9-7348.

J0049-732. (AX J0049-732, RX J0049.4-7310) This source was discovered as an X-ray pulsar by Imanishi, Yokogawa & Koyama (1998) with ASCA. The X-ray flux at 2-10 keV was about $8 \cdot 10^{-13}$ erg cm^{-2}s^{-1}. A more likely scenario for AX J0049-732 is either a Be/X-ray binary or an anomalous X-ray pulsar. Direct information to distinguish these two possibilities can be obtained by measuring the pulse period derivative and its orbital modulation. Two source, No. 427 and No. 430, in the ROSAT PSPC catalogue of Haberl et al. (2000) are possible counterparts of AX J0049-732. Filipovic et al. (2000) searched for optical counterparts of these ROSAT sources, and found an emission line object, possibly a Be star, at the position of source No. 430, but found no counterpart for source No. 430. Hence, they suggest that source No. 427 is more likely to be a counterpart of AX J0049-732. However, the angular separation of these sources of 1.′43 is significantly larger than the ASCA error radius. And Ueno et al. (2000a) propose that No. 430 is a more likely counterpart.

J0049-729. (AX J0049-729, AX J0049-728, RX J0049.0-7250, RX J0049.1-7250, XTE J0049-729) This source was discovered with ROSAT (Kahabka & Pietch 1996) in pointed observations. Yokogawa & Koyama (1998a) reported X-ray pulsations in ASCA data of this source. The X-ray flux in the band 0.7-10 keV was $1.2 \cdot 10^{-11}$ erg cm^{-2}s^{-1}, with sinusoidal pulse modulation. Kahabka & Pietch (1998) suggested the highly variable source RX J0049.1-7250 as a counterpart. Stevens et al. (1999) identified two Be stars, one only 3′′ from the X-ray position and one just outside the error circle given by Kahabka & Pietch (1996). Yokogawa et al. (1999) reported on the results of two ASCA observations of this X-ray source. The pulse fraction was $\sim 70\%$ independent of the X-ray energy.

J0049.4-7323. (AX J0049.4-7323, AX J0049.5-7323, RX J0049.7-7323) This X-ray source has been detected 5 times to date, 3 times by the ASCA observatory (Yokogawa et al. 2000b) and 2 times by the RossiXTE spacecraft. Ueno et al. (2000b) reported an ASCA observation which revealed coherent pulsations of period 755.5 ± 0.6 s from a new source in the Small Magellanic Cloud. The spectrum was characterized by a flat power-law function with photon index 0.7 and X-ray flux $1.1 \cdot 10^{-12}$ erg cm^{-2}s^{-1} (0.7-10 keV). They noted that the possible Be/X-ray binary RX J0049.7-7323 (Haberl & Sasaki 2000) was located within the ASCA error region. Edge & Coe (2003) reported on the spectroscopic and photometric analysis of possible optical counterparts to AX J0049.4-7323. They detected strong H_α emission from the optical source identified with RX J0049.7-7323 within error circle for AX J0049.4-7323 and concluded that these are one and the same object. They noted that the profile of the curve exhibits a distinct double peak. This is consistent with Doppler effects which would be expected from a circumstellar disc viewed in the plane of rotation. There is also definite V/R asymmetry between the peaks. It is a compelling evidence for the presence of a Be star. Cowley & Schmidtke (2003) analysed the long term light curve of the optical counterpart obtained from the MACHO date base. They showed that the optical object exhibited outbursts every 394 d which they proposed to be the orbital period of the system. They also showed the presence of a quasi-periodic modulation with a period $\sim$ 11d which they associated with the rotation of the Be star disk. The phase of two RXTE detections is exactly syncronised with the ephemeris derived from the optical outbursts. Therefore, as Coe & Edge (2004) concluded, the period of 394 d can represent the binary period of a system with X-ray outbursts syncronised with the periastron passage of the neutron star.

0050-727. (SMC X-3, H 0050-727, 2S 0050-727, 3A 0049-726, 1H 0054-729, H 0048-731, 1XRS 00503-727) SMC X-3 was detected by Li, Jernigan & Clark (1977) with SAS 3. This long-known X-ray source was not detected by the ROSAT PSPC. But it is included in the HRI catalogue. Marshall et al. (1997) reported the detection with the RXTE PCA of an outburst from the X-ray transient SMC X-3 and the discovery of a period of 92 ± 1.5 s with a complex pulse profile.

J0050.7-7316. (DZ Tuc, AX J0051-732, RX J0050.6-7315, RX J0050.7-7316, AX J0051-733, RX J0050.8-7316) This X-ray source was detected in Einstein IPC, ROSAT PSPC and HRI archival data and 18 year history shows flux variations by at least a factor of 10 (Imanishi et al. 1999). The source was reported as a 323 s pulsar by Yokogawa & Koyama (1998b) and Imanishi et al. (1999). Subsequently Cook (1998) identified a 0.7 d optically variable object within the ASCA X-ray error circle. Long term optical data from over 7 years revealed both a 1.4d modulation and an unusually rapid change in this possible binary period (Coe et al. 2002). The system was discussed in the context of being a normal high mass X-ray binary by Coe & Orosz (2000) who presented some early OGLE data on the object identified by Cook (1998) and modelled the system parameters. Coe & Orosz identified several problems with understanding this system, primarly that if it was a binary then its true period would be 1.4 d and it would be an extremely compact system. In addition, the combination of the pulse period and such a binary period violates the Corbet relationship for such systems (Corbet 1986). Raguzova & Lipunov (1998) cal-

culated the critical orbital period for existence of a Be+X-ray pulsar binary, which is $\sim 10-20$ d. They proposed an explanation for the lack of Be stars with accreting neutron star as companions with orbital periods less than 10 days as caused by synchronization of Be star during its evolution. Coe et al. (2002) reported on extensive new data sets from both OGLE and MACHO, as well as on detailed photometric study of the field. Their results reveal many complex observational features that are hard to explain in the traditional Be/X-ray binary model.

J0051-722. (AX J0051-722, RX J0051.3-7216) This source was at first detected as a 91.12 s pulsar in RXTE observations (Corbet et al. 1998) although it was initially confused with the nearby 46 s pulsar 1WGA J0053.8-7226 (Buckley et al. 1998). Stevens et al. (1999) estimated the magnitude of the optical component (Be star) as $V \sim 15$ from Digitised Sky Survey images. The spacing of flares observed from AX J0051-722 suggests an orbital period of about 120 days (Israel et al. 1998).

0051.1-7304. (2E 0051.1-7304, AzV 138) For this source listed as entry 31 in the Einstein IPC catalogue of Wang & Wu (1992) the Be star AzV 138 (Garmany & Humphreys 1985) was proposed as an optical counterpart. 2E 0051.1-7304 was not detected in ROSAT observations.

J0051.8-7231. (2E 0050.1-7247, RX J0051.8-7231, 1E 0050.1-7247, 1WGA J0051.8-7231) 2E 0050.1-7247 was discovered in Einstein observations. The X-ray luminosity, time variability and hard spectrum led Kahabka & Pietch (1996) to suggest a Be/X-ray binary nature for the source. Israel et al. (1995) discovered 8.9 s X-ray pulsations in 2E 0050.1-7247 during a systematic search for periodic signals in a sample of ROSAT PSPC light curves. The signal had a nearly sinusoidal shape with a 25-percent pulsed fraction. The source was detected several times between 1979 and 1993 at luminosity levels ranging from $5 \cdot 10^{34}$erg s^{-1} up to $1.4 \cdot 10^{36}$erg s^{-1} with both the Einstein IPC and ROSAT PSPC. The X-ray energy spectrum is consistent with a power-law spectrum that steepens as the source luminosity decreases. Israel et al. (1997) revealed a pronounced H_α activity from at least two B stars in the X-ray error circles. These results strongly suggest that the X-ray pulsar 2E 0050.1-7247 is in a Be-type massive binary.

J0051.9-7311. (2E 0050.2-7326, RX J0051.8-7310, AX J0051.6-7311, RX J0051.9-7311) This X-ray source was detected by Cowley et al. (1997) during ROSAT HRI observations of Einstein IPC source 25 and identified with a Be star by Schmidtke et al. (1999).

0052-723. (XTE J0052-723) Corbet, Marshall & Markwardt (2001) discovered this transient X-ray pulsar in the direction of the Small Magellanic Cloud from RXTE PCA observations made on 2000 December 27 and 2001 January 5. Pulsations were seen with a period of 4.782 ± 0.001 s and with a double-peaked pulse profile. Spectroscopy of selected optical candidates (Laycock et al. 2003) has identified the probable counterpart which is a B0V-B1Ve SMC member exhibiting a strong, double peaked H_α emission line.

J0052.1-7319. (1E 0050.3-7335, 2E 0050.4-7335, RX J0052.1-7319) The X-ray transient RX J0052.1-7319 was discovered by Lamb et al. (1999) with the analysis of ROSAT HRI and BATSE data. The object showed a period of 15.3 s (Kahabka 1999a; Kahabka 1999b) and a flux in the 0.1-2 keV band of $2.6 \cdot 10^{-11}$ erg cm^{-2}s^{-1}. Covino et al. (2001) reported on the discovery and confirmation of the optical counterpart of this transient X-ray pulsar. They found a $V = 14.6$ O9.5IIIe star (a classification as a B0Ve star is also possible since the luminosity class depends on the uncertainty on the adopted reddening).

J0052.9-7158. (2E 0051.1-7214, RX J0052.9-7158, XTE J0054-720, AX J0052.9-7157) This source was detected as an X-ray transient by Cowley et al. (1997) during ROSAT HRI observations of Einstein IPC source 32. The strong variability and the hard X-ray spectrum imply a Be/X-ray transient consistent with the suggested Be star counterpart (Schmidtke et al. 1999). The X-ray source was detected by ROSAT and is located near the edge of the error circle of XTE J0054-720. The transient pulsar XTE J0054-720 with spin period ~ 169 s was discovered with RXTE (Lochner et al. 1998). Yokogawa et al. (2003) detected coherent pulsations with 167.8 s period from AX J0052.9-7157 and determined its position accurately. They found that AX J0052.9-7157 is located within the error circle of XTE J0054-720 and has a variable Be/X-ray binary, RX J0052.9-7158, as a counterpart. From the nearly equal pulse period and the positional coincidence, they concluded that the ASCA, ROSAT, and RXTE sources are identical.

J0053.8-7226. (RX J0053.9-7226, 1WGA J0053.9-7226, 1E 0052.1-7242, 2E 0052.1-7242, RX J0053.8-7226, 1WGA J0053.8-7226, XTE J0053-724) This object was serendipitously discovered as an X-ray source in the SMC in the ROSAT PSPC archive and also was observed by the Einstein IPC. Its X-ray properties, namely the hard X-ray spectrum, flux variability and column density indicate a hard, transient source with a luminosity of $3.8 \cdot 10^{35}$ erg s^{-1} (Buckley et al. 2001). XTE and ASCA observation have confirmed the source to be an X-ray pulsar, with a 46 s spin period. Optical observations (Buckley et al. 2001) revealed two possible counterparts to this source. Both exhibit strong H_α and weaker H_β emission. The optical colours indicate that both objects are Be stars. The transient X-ray system XTE J0053-724 was also detected by RXTE. Pulsations of 46.6 ± 0.1 s were observed with a pulse fraction of about 25% (Lochner 1998). Lochner (1998) suggested a possible orbital period of this Be/X-ray system of about 139 days which is determined from the periodicity of X-ray outbursts.

0053-739. (SMC X-2, 3A 0042-738, H 0052-739, 2S 0052-739, H 0053-739, RX J0054.5-7340) SMC X-2 was one of the first three X-ray sources which were discovered in the SMC (Clark et al. 1978). It was also detected in the HEAO 1 A-2 experiment (Marshall et al. 1979), but not in the Einstein IPC survey (Seward & Mitchell 1981). In ROSAT observations this transient source was detected only once (Kahabka & Pietch 1996). It is thought to be a Be/X-ray binary, since a Be star was found as its optical counterpart (Murdin et al. 1979). In early 2000, the RXTE All-Sky Monitor detected an outburst at the position of SMC X-2 (Corbet et al. 2001) and a pulse period of 2.374 ± 0.007 s was determined (Corbet & Marshall 2000; Torii et al. 2000). The source was in low luminosity state during the XMM-Newton observation (Sasaki, Pietch & Haberl 2003). In order to estimate the flux

upper limit Sasaki, Pietch & Haberl (2003) used spectral parameters derived by Yokogawa et al. (2001) from the ASCA spectrum during the outburst. They obtained an upper limit for the un-absorbed flux of $1.5 \cdot 10^{-14}$ erg cm^{-2}s^{-1}, corresponding to $L_{\rm x} = 6.5 \cdot 10^{33}$ erg s^{-1} (0.3 – 10.0 keV).

0053+604. (γ Cas, 3A 0053+604, BD+59 144, HD 5394, LS I +60°133, 2S 0053+604, 1H 0053+604, 4U 0054+60) γ Cassiopeiae is one of the best known Be stars; it was the first emission-line star discovered by Angelo Secchi in 1866, and it has spectral classification of B0 IVe. Its visual magnitude varies between about 3.0 and 1.6, although usually it stays around 2.5. This object is one of the ROSAT bright sources and also an IRAS source. γ Cas has long been known to be very variable in optics and it is also a moderately strong X-ray source with a luminosity of the order of 10^{33} erg s^{-1} (Mason et al. 1976; White et al. 1982). Such a luminosity would not be surprising for X-ray emission from an early type star of spectral type O or B — some active early type stars have a similar luminosity (Corcoran et al. 1994; Koyama et al. 1994). However, the hardness of the X-ray emission from γ Cas is extraordinarily high in comparison with usual X-ray emission from early type stars. If we fit the spectrum with a thermal model the resultant temperature is roughly 10 keV or more (Horaguchi et al. 1994; Murakami et al. 1986). It is not common for early type stars, and resembles more the spectra of X-ray pulsars and accreting white dwarf binaries. There are currently two competing interpretations of the nature of the observed X-ray emission: one is the accretion of the wind from γ Cas onto a white dwarf companion and the other one is that it originates from some physical processes in the outer atmosphere of γ Cas itself. Arguments for and against these two hypotheses are best summarized in studies by Kubo et al. (1998) and Robinson & Smith (2000).

J0054.9-7226. (2E 0053.2-7242, RX J0054.9-7226, 1WGA J0054.9-7226, SAX J0054.9-7226, RX J0054.9-7227, XTE J0055-724) RX J0054.9-7226 is known to be an X-ray binary pulsar with a pulse period of 58.969 ± 0.001 s (Marshall et al. 1998; Santangelo et al. 1998). Lochner et al. (1999) have measured the orbital period: 65 d. In the timing analysis of the XMM-Newton data, the pulse period was verified to be 59.00 ± 0.02 s (Sasaki, Pietch & Haberl 2003). The optical counterpart, a Be star, is identified with the variable star OGLE J005456.17-722647.6 (Zebrun et al. 2001).

J0057.4-7325. (AX J0057.4-7325) Six ROSAT observations have covered the position of AX J0057.4-7325. Coherent pulsations with a barysentric period of 101.45 ± 0.07 s were discovered by Yokogawa et al. (2000d) with ASCA. The flux variability, the hard X-ray spectrum, and the long pulse period are consistent with the hypothesis that AX J0057.4-7325 is an X-ray binary pulsar with a companion which is either a Be, an OB supergiant, or a low-mass star. Yokogawa et al. (2000d) found only one optical source, MACS J0057-734 10, in the ASCA error circle. They note that OB supergiant X-ray binaries in the SMC (only SMC X-1 and EXO 0114.6-7361) are both located in the eastern wing and this fact may lead us to suspect that AX J0057.4-7325 would be the third example.

J0058.2-7231. (RX J0058.2-7231, RX J0058.3-7229) Schmidtke et al. (1999) reported the detection of this very weak X-ray source by ROSAT HRI. Its optical counterpart is a variable Be star in the SMC, OGLE 00581258-7230485 (Zebrun et al. 2001).

J0058-720. (AX J0058-720, RX J0057.8-7202) The pulse period of AX J0058-720 was determined from the ASCA data as 280.4 ± 0.3 s (Yokogawa & Koyama 1998b), which Sasaki, Pietch & Haberl (2003) confirmed in the XMM-Newton data: 281.1 ± 0.2 s. The source has been suggested as a Be/X-ray candidate due to the likely optical counterpart, which is an emission line object.

J0059.2-7138. (RX J0059.2-7138) The supersoft source RX J0059.2-7138 was detected serendipitously with the ROSAT PSPC in 1993 and was seen almost simultaneously be ASCA (Hughes 1994; Kylafis 1996). Previously, it had failed to be detected by either the Einstein Observatory or EXOSAT in the early 1980s, or in pointed ROSAT observations of 1991. The transient nature of this source is clearly established. The best fit to the X-ray spectrum consists of three components (Kylafis 1996): two power laws with indices 0.7 and 2.0 fit the spectrum in the > 3 KeV and 0.5-3.0 keV bands respectively. Furthemore, the emission is pulsed at levels of ∼ 35% and ∼ 20% in these respective bands, with a period of ∼ 2.7 s (Hughes 1994). Southwell & Charles (1996) identified the probable optical counterpart of this source with a 14th-magnitude B1 III emission star lying within the X-ray error circle.

J0101.0-7206. (RX J0101.0-7206) The X-ray transient RX J0101.0-7206 was discovered in the course of ROSAT observations of the SMC in October 1990 (Kahabka & Pietch 1996) at a luminosity of $1.3 \cdot 10^{36}$ erg s^{-1}. The source showed a luminosity of $3 \cdot 10^{33}$ ergs^{-1} in the ROSAT band (0.1-2.4 keV) during two XMM-Newton observations (Sasaki, Pietch & Haberl 2003). Pulsations with a period of 304.49 ± 0.13 s were discovered in Chandra data (Macomb et al. 2003). This period could not be verified in the XMM-Newton observation, because the source was too faint. Edge & Coe (2003) presented results on the optical analysis of likely counterparts, discussing two objects (Nos. 1 and 4) in the ROSAT PSPC error circle. They conclude that the optical counterpart is object No. 1 which is confirmed to be a Be star.

J0101.3-7211. (RX J0101.3-7211) The source was detected in ROSAT observations and proposed by Haberl & Sasaki (2000) as a Be/X-ray candidate. The optical counterpart (OGLE 01012064-7211187) is a Be star.

J0103-722. (AX J0103-722, 2E 0101.5-7225, SAX J0103.2-7209, CXOU J010314.1-720915, 1E 0101.5-7226) For the Be/X-ray binary AX J0103-722 a pulse period of 345.2 ± 0.1 s was determined by Israel et al. (1998). In the XMM-Newton data, pulsations were confirmed with a period of 341.7 ± 0.4 s (Sasaki, Pietch & Haberl 2003). This source was detected with a nearly constant flux in all the Einstein, ROSAT and ASCA pointings which surveyed the relevant region of the SMC.

J0106.2-7205. (SNR 0104-72.3, RX J0106.2-7205, 2E 0104.5-7221) SNR 0104-72.3 contains a pointlike X-ray source with a blue optical counterpart and H_α emission.

0103-762. (0107-750) (1H 0103-762, H 0107-750) This source is a very bright UV object with prominent H_α and H_β emission.

J0105-722. (AX J0105-722, RX J0105.3-7210, RX J0105.1-7211) Yokogawa & Koyama (1998c) reported AX J0105-722 as an X-ray pulsar with a period of 3.34 s. From ROSAT

PSPC images Filipovic et al. (2000) resolved this source into several X-ray sources. They combined X-ray, radio-continuum and optical data to identify the sources: for RX J0105.1-7211 they proposed an emission line star from the catalogue of Meyssonier & Azzopardi in the X-ray error circle as the likely optical counterpart. This catalogue contains several known Be/X-ray binaries strongly suggesting RX J0105.1-7211 as a new Be/X-ray binary in the SMC.

J0111.2-7317. (XTE J0111.2-7317, XTE J0111-732(?)) The X-ray transient XTE J0111.2-7317 was discovered by the RXTE X-ray observatory in November 1998 (Chakrabarty et al. 1998a). Analysis of ASCA observation (Chakrabarty et al. 1998b, Yokogawa et al. 2000a) identified this source as a 31 s X-ray pulsar with a flux in the 0.7-10 keV band of $3.6 \cdot 10^{-10}$ erg cm^{-2}s^{-1} and $\sim$ 45% pulsed fraction. The detection was also confirmed from the BATSE telescope on the CGRO satellite which detected the source in the hard 20-50 keV band with a flux ranging from 18 to 30 mCrab (Wilson & Finger (1998)). The source was not detected by ROSAT. In the X-ray error box of XTE J0111.2-7317 Covino et al. (2001) found a relatively bright object (V=15.4) which has been classified as a B0.5-B1Ve star and that was later confirmed by Coe et al. (2000) as the most plausible counterpart for XTE J0111.2-7317. There is also evidence for the presence of a surrounding nebula, possibly a supernova remnant (Covino et al. 2001).

0115+634. (V635 Cas, 1H 0115+635, 4U 0115+63, 3U 0115+63, 2E 0115.1+6328, H 0115+634, 4U 0115+634) This source is one of the best studied Be/X-ray systems. This transient was first reported in the Uhuru satellite survey (Giacconi et al. 1972; Forman et al. 1978), though a search in the Vela 5B data base revealed that the source had already been observed by this satellite since 1969 (Whitlock, Roussel-Dupre & Priedhorsky 1989). X-ray outbursts have been observed from 4U 0115+63 with Uhuru (Forman, Tananbaum & Jones 1976), HEAO-1 (Wheaton et al. 1979; Rose et al. 1979), Ginga (Tamura et al. 1992), CGRO/Batse (Bildsten et al. 1997), RXTE (Wilson, Harmon & Finger 1999; Heindl & Coburn 1999; Coburn, Rotschild & Heindl 2000) and reoccur with a separation times of one to several years. Precise positional determinations by the SAS 3, Ariel V and HEAO-1 satellites (Cominsky et al. 1978; Johnston et al. 1978) were used to identify this system with a heavily reddened Be star with a visual magnitude $V = 15.5$ (Johns et al. 1978; Hutchings & Crampton 1981b). Rappaport et al. (1978) used SAS 3 timing observations to derive the orbital parameters of this binary system. Due to the fast rotation of the neutron star centrifugal inhibition of accretion prevents the onset of X-ray emission unless the ram pressure of accreted material reaches a relatively high value. Magnetic field of the neutron star is $1.3 \cdot 10^{12}$ G (Makishima et al. 1999). Pulse fraction was obtained in a model-dependent way in the range 20-50 keV (see Harmon et al. 2004 for details and references).

J0117.6-7330. (RX J0117.6-7330) This X-ray transient was discovered by the PSPC on board ROSAT (Clark, Remillard & Woo 1996; Clark, Remillard & Woo 1997). Soria (1999) conducted spectroscopic and photometric observations of the optical companion of the X-ray transient RX J0117.6-7330 during a quiescent state. The primary component was identified as a B0.5 IIIe star. Macomb et al. (1999) reported on the detection of pulsed, broadband, X-ray emission from this transient source. The pulse period of 22 s was detected by the ROSAT/PSPC instrument and by the Compton Gamma-Ray Observatory/BATSE instrument. The total directly measured X-ray luminosity during the ROSAT observation was $1.0 \cdot 10^{38}$ erg s^{-1}. The pulse frequency increased rapidly during the outburst with a peak spin-up rate of $1.2 \cdot 10^{-10}$ Hz s^{-1} and a total frequency change of 1.8%. The pulsed percentage was 11.3% from 0.1-2.5 keV, increasing to at least 78% in the 20-70 keV band. These results established RX J0117.6-7330 as a transient Be binary system.

J0146.9+6121. (V831 Cas, 2S 0142+61, RX J0146.9+6121, LS I +61°235) RX J0146.9+6121 is an accreting neutron star with a 25 min spin period, the longest known period of any X-ray pulsar in a Be-star system. This fact was realized (Mereghetti et al. 1993) only after the re-discovery of this source in the ROSAT All Sky Survey and its identification with the 11th magnitude Be star LS I +61°235 (Motch et al. 1991). Indeed the 25 min periodicity had already been discovered with EXOSAT (White et al. 1987), but it was attributed to a nearby source 4U 0142+614. The optical star is probably a member of the open cluster NGC 663 at a distance of about 2.5 kpc (Tapia et al. 1991). For this distance, the 1-20 keV luminosity during the EXOSAT detection in 1984 was $\sim 10^{36}$ erg s^{-1} (Mereghetti et al. 1993). All the observations of RX J0146.9+6121 carried out after its re-discovery yielded lower luminosities, of the order of a few 10^{34} erg s^{-1} , until an observation with the Rossi XTE satellite showed that in July 1997 the flux started to rise again (Haberl et al. (1998)), though not up to the level of the first EXOSAT observation.

0236+610. (V615 Cas, 2E 0236.6+6101, LS I +61°303, 1E 0236.6+6100, RX J0240.4+6112) LS I +61°303 is a radio emitting X-ray binary which exhibits radio outbursts every 26.5 d. The radio outburst peak and the outburst phase are known to vary over a time scale of $\sim$ 4 yr (Gregory et al. 1989; Gregory 1999). The 26.5 d period is believed to be the orbital period. Hutchings & Crampton (1981) confirmed the radio period by analysis of three-year observation of radial velocity. They concluded that the optical spectrum corresponds to a rapidly rotating B0 V star. The 4 yr modulation has been discovered on the basis of continued radio monitoring.

0331+530. (BQ Cam, EXO 0331+530, V 0332+53) EXOSAT observed three outbursts from V0332+53 between 1983 November and 1984 January, leading to the discovery of the 4.4 s spin period and a sudden decrease of luminosity at the end of $\sim$ 1 month long recurrent outbursts. The latter result was interpreted as the onset of the centrifugal barrier (Stella et al. 1985; Stella, White & Rosner 1986). An upper limit of $\sim 5 \cdot 10^{33}$ erg s^{-1} to the source quiescent emission (1–15 keV) was derived on that occasion with the EXOSAT Medium Energy Detector. Doppler shifts in pulse arrivals indicate that the pulsar is in orbit around a Be star with a period of 34.3 days and eccentricity 0.3 (Stella et al. 1985). Observations during a subsequent outburst with Ginga led to the discovery of a cyclotron line feature corresponding to $3 \cdot 10^{12}$ G magnetic field

(Makishima et al. 1984). BeppoSAX and Chandra observations allowed to study this transient at the faintest flux levels thus far (Campana et al. 2002). Campana et al. (2002) concluded that the quiescent emission of this X-ray transient likely originates from accretion onto the magnetospheric boundary of the neutron star in the propeller regime and/or from deep crustal heating resulting from pycnonuclear reactions during the outbursts.

0352+309. (X Per, HD 24534, 3A 0352+309, 2E 0352.2+3054, H 0352+309, 4U 0352+30, 4U 0352+309, 1H 0352+308, 2A 0352+309, H 0353+30, HD 24534, 3U 0352+30) The X-ray source 4U 0352+309 is a persistent low luminosity pulsar in a binary system with the Be star X Persei (X Per). Its 837 s pulsation period was discovered with the UHURU satellite (White et al. 1976; White, Mason & Sanford 1977), and is still one of the longest periods of any known accreting pulsar (Bildsten et al. 1997, and references therein). X Per is a bright and highly variable star with a visual magnitude that ranges from $\sim$ 6.1 to $\sim$ 6.8 (Mook et al. 1974; Roche et al. 1997). The spectral class has been estimated to be O9.5 III to B0 V (Slettebach 1982; Fabregat et al. 1992; Lyubimkov et al. 1997). Based on spectroscopic parallax, distance estimates range from 700 ± 300 pc up to 1.3 ± 0.4 kpc (Fabregat et al. 1992; Lyubimkov et al. 1997; Roche et al. 1997; Telting et al. 1998). The X-ray luminosity varies on long timescales (years) from $\sim 3 \cdot 10^{35}$ erg s^{-1} to $\sim 5 \cdot 10^{34}$ erg s^{-1} (for assumed distance of 1.3 kpc; Roche et al. 1993). Delgado-Marti et al. (2001) have determined a complete orbital ephemeris of the system using data from the Rossi X-ray Timing Explorer (RXTE). Coburn et al. (2001) have discovered a cyclotron resonant scattering feature at 29 keV in the X-ray spectrum of 4U 0352+309 using observation taken with the RXTE. The cyclotron resonant scattering feature energy implies a magnetic field strength at the polar cap of $3.3 \cdot 10^{12}$ G.

J0440.9+4431. (RX J0440.9+4431, VES 826) RX J0440.9+4431/BSD 24-491 was confirmed as an accreting Be/X-ray system following the discovery of X-ray pulsations, with barycentric pulse period of 202.5 ± 0.5 s from RXTE observations (Reig & Roche 1999b).

J0501.6-7034. (RX J0501.6-7034, 2E 0501.8-7038, 1E 0501.8-7036, HV 2289, CAL 9) This Einstein and ROSAT variable source was identified with a Be star by Schmidtke et al. (1994). Later Schmidtke et al. (1996) identified this star with HV 2289, a known variable with a large amplitude of variability.

J0502.9-6626. (RX J0502.9-6626, CAL E) The X-ray source RX J0502.9-6626 was originally detected by the Einstein observatory (Cowley et al. 1984) at a flux of $\sim 3{\cdot}10^{36}$ erg s^{-1}. The source was detected three times with the ROSAT PSPC at luminosities $\sim 10^{35} - 10^{36}$ erg s^{-1} and once with the HRI during a bright outburst at $4 \cdot 10^{37}$ erg s^{-1} (Schmidtke et al. (1995)). During the outburst, pulsations at 4.0635 s were detected. The identification of this source with the Be star [W63b] 564 = EQ 050246.6-663032.4 (Wooley 1963) was confirmed by Schmidtke et al. (1994).

J0516.0-6916. (RX J0516.0-6916) The identification of this source with a Be-star is unclear. In several observations the source did not display any characteristics of Be behaviour, however, Schmidtke et al. (1999) classify it as a Be-star.

J0520.5-693. (RX J0520.5-6932) This X-ray source has been observed at a low X-ray luminosity ($5{\cdot}10^{34}$ erg s^{-1}) in early 90-s by ROSAT (Schmidtke et al. 1994). The light curve of the optical counterpart exhibits significant modulation with a period of 24.5 d, which is interpreted as the orbital period (Coe et al. 2001). A spectral type of O9V was proposed for the optical counterpart. In a recent paper Edge et al. (2004) present new optical and IR data and archive BATSE data on the ouburst.

J0529.8-6556. (RX J0529.8-6556, RX J0529.7-6556) The transient X-ray source RX J0529.8-6556 was detected during one single outburst as a 69.5-s X-ray pulsar by Haberl et al. (1997), who identified it with a relatively bright blue star showing weak H_α emission.

053109-6609.2. (EXO 053109-6609.2, RX J0531.2-6609, RX J0531.2-6607, EXO 0531.1-6609) This source was discovered by EXOSAT during deep observations og the LMC X-4 region in 1983 (Pakull et al. 1985). It was detected again in 1985 by the SL2 XRT experiment. The lack of detection in EXOSAT observations made between these dates demonstrates the transient nature of the source. The companion is optically identified with a Be star (Haberl et al. 1995). Burderi et al. (1998) reported a timing analysis of the Be transient X-ray binary EXO 053109-6609.2 in outburst observed with BeppoSAX. The pulsed fraction is about constant in the whole energy range. The source shows pulsations from 0.1 up to 60 keV. In the MECS (Medium Energy Concentrator Spectrometer) pulse profile in the 1.8-10.5 keV band the pulsed fraction is 0.54 ± 0.05. In the LECS (Low Energy Concentrator Spectrometer) pulse profile (the 0.1-1.8 keV band), the main pulse is still evident, while the interpulse is more broadened, and pulsed fraction is 0.78 ± 0.28. The PDS (Phoswich Detection System) pulse profile (15-60 keV energy band) still shows a double-peaked structure (pulsed fraction is 0.64 ± 0.16) in phase with the previous ones. Although the statistics is poor, the pulsed fraction does not seem to decrease with energy (Burderi et al. 1998).

J0531.5-6518. (RX J0531.5-6518) This source was detected with the ROSAT PSPC in June 1990 (Haberl & Pietsch 1999). The source is probably variable, since other pointings failed to detect it. The optical counterpart is probably a Be star coming back from an extended disk-less phase (Negueruela & Coe 2002).

J0535.0-6700. (RX J0535.0-6700) This source was observed by the ROSAT PSPC at a luminosity $\sim 3 \cdot 10^{35}$erg s^{-1} (Haberl & Pietsch 1999). Its positional coincidence with an optically variable star in the LMC (RGC28 in Reid, Glass & Catchpole 1988) is very good. RGC28 is an early-type Be star and likely it is the optical counterpart to RX J0535.0-6700 (Negueruela & Coe 2002). The star displays periodic variability in its I-band lightcurve at 241 d, which Reid, Glass & Catchpole (1988) originally believed to be the period of a Mira variable. Haberl & Pietsch (1999) suggested that this variability can be related to the orbital period.

0535-668. (RX J0535.6-6651, 1A 0538-66, 1A 0535-66) This source was discovered by the Ariel 5 satellite in June 1977, during outburst in which the flux peaked at $\sim 9 \cdot 10^{38}$erg s^{-1} (White & Carpenter 1978). When active, 1A 0535-66 displays

very bright short X-ray outbursts separated by 16.6 days, which is believed to be the orbital period. The optical counterpart experiences drastic changes in the spectrum, with the appearance of strong P-Cygni-like emission lines, and brightening by more than 2 mag in the V band (Charles et al. 1983). The Be star has a V magnitude of $\sim$ 14.8 during the X-ray quiescent periods. The magnitude reaches a peak of 12.5 mag during the X-ray outbursts. Detection of a 69-ms pulsation in the X-ray signal has been reported only once (Skinner et al. 1982). Further X-ray observations of outbursts were made by Skinner et al. (1980) using the HEAO 1 satellite. The X-ray outbursts were found to last up to at least 14 days or to be as short as a few hours. 1A 0535-66 in its largest outbursts (Skinner et al. 1980) has luminosity around 10^{39} ergs^{-1}. ROSAT (Mavromatakis & Haberl 1993) and ASCA observations (Corbet et al. 1995) have revealed low-level outbursts with luminosities of $4 \cdot 10^{37}$ erg s^{-1} and $2 \cdot 10^{37}$ erg s^{-1} in the two ROSAT observations and $\sim 5.5 \cdot 10^{36}$ erg s^{-1} in the ASCA observation. Due to the low count rate and sampling frequency it was not possible to determine whether the 69 ms pulsations were present in the data. The ratio of $L_{\rm max}$ to $L_{\rm min}$ in soft X-rays is > 1000.

0535+262. (V725 Tau, HD 245770, 1A 0535+26, 1H 0536+263, 3A 0535+262, BD+26 883, 4U 0538+26, 1A 0535+262, H 0535+262) The transient A 0535+26 is one of the best studied Be/X-ray binaries. This source was discovered in 1975 by Ariel 5 (Rosenberg et al. 1975) and showed a periodicity at 104 s indicating the presence of a highly magnetized neutron star. The optical counterpart was later identified with the Be star HDE 245770 (Li et al. 1979) allowing the classification of the source as a Be/X-ray binary. The pulsed fraction is 20% at 30-40 keV and increases significantly with energy, reaching 100% at 100 keV (Frontera et al. 1985). Magnetic field of the neutron star is $4.3 \cdot 10^{12}$ G (Makishima et al. 1999).

0544-665. (H 0544-665, H 0544-66) This source was discovered with the HEAO-1 scanning modulation collimator by Johnston, Bradt & Doxcey (1979). The brightest object within the X-ray error circle was found to be a variable B0-1 V star (van der Klis et al. 1983) but no emission lines have been observed in its spectrum to identify it as a Be star. van der Klis et al. (1983) published photometry which showed a negative correlation between optical magnitudes and colour indices, typical of Be stars whose variability is due to variations in the circumstellar disc. Stevens et al. (1999) suggested that the object may be a Be star in the state of low activity.

J0544.1-710. (RX J0544.1-7100, AX J0544.1-7100, AX J0548-704, 1WGA J0544.1-7100, 1SAX J0544.1-7100) This source is a transient X-ray pulsar (P = 96 s) with the hardest X-ray spectrum observed by ROSAT in the LMC (Haberl & Pietsch 1999). The observations of the optical counterpart were presented by Coe et al. (2001), who found it to display large variability in the I-band lightcurve and H_α in emission. An approximate spectral type of B0 Ve was proposed.

0556+286. (4U 0548+29, 1H 0556+286) The X-ray source was detected by HEAO1, earlier probably observed by UHURU 4U 0548+29 (Wood et al. 1984). No detection was made after that. A Be-star is known in this direction.

J0635+0533. (SAX J0635+0533) Discovered by BeppoSAX (Kaaret et al. 1999). Ziolkowski (2002) gives the spectral classification of the optical counterpart as B0.5 IIIe. X-ray luminosty is $(9-35) \cdot 10^{35}$ erg s^{-1} (2-10 keV) for d = 2.5 – 5 kpc (Kaaret et al. 1999). Bolometric luminosity (0.1-40 keV) was estimated to be $1.2 \cdot 10^{35}$ erg s^{-1} for d = 5 kpc (Cusumano et al. 2000). Pulse fraction was obtained by BeppoSAX (2-10 keV). The source can be identified with the gamma-ray source 2EG J0635+0521. Low luminosity together with very fast rotation propose that the NS has a low magnetic field (see discussion in Cusumano et al. 2000).

0726-260. (4U 0728-25, 3A 0726-260, V441 Pup, 1H 0726-259, LS 437) Detected by many experiments (UHURU, HEAO1, Ariel 5, ROSAT, RXTE). Pulse fraction was estimated as $(I_{\rm max} - I_{\rm min})/(I_{\rm max} + I_{\rm min})$ from the graph in Corbet & Peele (1997) (RXTE 2-20 keV). The spectral and photometrical analysis of this source led Negueruela et al. (1996) to conclude that the primary is an O8-9Ve star.

0739-529. (1H 0739-529) Detected by HEAO1 (Wood et al. 1984).

0749-600. (1H 0749-600) Detected by HEAO1 (Wood et al. 1984). Situated in the open cluster NGC 2516 (Liu, van Paradijs & van den Heuvel 2000).

J0812.4-3114. (RX J0812.4-3114, V572 Pup, LS 992) RX J0812.4-3114 was discovered by Motch et al. (1997) during a search for high-mass X-ray binaries by cross-correlating SIMBAD OB star catalogs with low Galactic latitude sources from the ROSAT all-sky survey. This X-ray source thus has an identified optical counterpart, the Be star LS 992, and so it was suspected that this source belongs to the Be/X-ray binaries. Reig et al. (2001) classify it as B0.2 IVe. The X-ray light curve of LS 992/RX J0812.4-3114 is characterised by 31.88 second pulsations, while the X-ray spectrum is best represented by an absorbed power-law component with a exponentially cut-off (Reig & Roche 1999a). In December 1997 the source made a transition from a quiescent state to a flaring state (Corbet & Peele 2000), in which regular flares separated by 80 day intervals were detected with the All-Sky Monitor (ASM) onboard the Rossi X-ray Timing Explorer. Corbet & Peele (2000) attributed the origin of these flares to the periastron passage of the neutron star, hence this periodicity was naturally associated with the orbital period. Corbet & Peele (2000) have found strong evidence for the presence of a $\sim$ 80 day period in the ASM light curve of RX J0812.4-3114. By comparison with other Be star X-ray binaries, the time of maximum flux is likely to coincide with periastron passage of a neutron star. The orbital period of $\sim$ 80 days combined with the $\sim$ 32 second pulse period is consistent with the correlation between orbital and pulse period that is found for the majority of Be/neutron star binaries (Corbet 1986).

0834-430. (GS 0834-430) The hard X-ray transient GS 0834-430 was discovered by the WATCH experiment on board GRANAT in 1990 at a flux level of about 1 Crab in the 5-15 keV energy band (see Wilson et al. 1997b). The source was later observed by GINGA (Makino 1990a; Makino 1990b) and ROSAT as a part of the All Sky Survey (Hasinger et al. 1990). The pulsations at a period of 12.3 s were observed during the GINGA, ROSAT and ART-P observations (Makino 1990c;

Aoki et al. 1992; Hasinger et al. 1990; Grebenev & Sunyaev 1991). GS 0834-43 was also monitored by BATSE) between April 1991 and July 1998. In particular seven outbursts were observed from April 1991 and June 1993 with a peak and intra-outburst flux of about 300 mCrab and < 10 mCrab, respectively (Wilson et al. 1997a). The recurrence time of 105-115 days was interpreted as the orbital period of the system. However, no further outbursts have been observed since July 1993 either with CGRO/BATSE and the All Sky Monitor on board RXTE. All these findings suggested that GS 0834-43 is a new Be-star/X-ray binary system with an eccentric orbit (Wilson et al. 1997a). Based on both photometric and spectroscopic findings Israel et al. (2000) concluded that optical counterpart of this X-ray pulsar is most likely a B0-2 V-IIIe star at a distance of 3-5 kpc. Pulse fraction was obtained by BATSE (20-50 keV).

J1008-57. (GRO J1008-57) Discovered by BATSE in 1993. Pulse fraction ~ 60% was obtained by ROSAT (0.1-2.4 keV) (Harmon et al. 2004). High-energy data (BATSE: 20-70 keV) gives nearly the same value about 67% (see Harmon et al. 2004). Orbital period is uncertain. An estimate of 247.5 days comes from the best fit of BATSE data (Negueruela & Okazaki 2001b). Other (earlier) estimates were about 135 days (Liu, van Paradijs & van den Heuvel 2000).

1036-565. (3A 1036-565, 1A 1034-56,) Probably the same object as J1037.5-5647.

J1037.5-5647. (LS 1698, RX J1037.5-5647) Discovered by ROSAT in 1997. Probably the same source as 4U1036-56/3A1036-565. The source was observed in quiescence (Reig & Roche 1999b). $L_{\rm min} = 1.1 \cdot 10^{34}$ erg s^{-1}. Pulse fraction was obtained by RXTE (3-20 keV).

1118-615. (1A 1118-615, 1A 1118-616, WRAY 15-793, 2E 1118.7-6138) The hard X-ray transient A 1118-615 was discovered serendipitously in 1974 by the Ariel-5 satellite (Eyles et al. 1975) during an observation of Cen X-3 (4U 1119-603). The same series of observations revealed pulsations with a period of 405.3 ± 0.6 s (Ives et al. 1975). However, in the initial announcement of the discovery of the pulsations, they were wrongly attributed to an orbital period, suggesting that A 1118-615 consisted of two compact objects (Ives et al. 1975). This hard X-ray transient underwent a major outburst only twice: in 1974, when it was discovered by Ariel-5 satellite, and from December 1991 to February 1992 (Bildsten et al. 1997). The source was observed by Motch et al. (1988) using the Einstein and EXOSAT observatories in 1979 and 1985 respectively. On both occasions a weak signal was detected confirming that low-level accretion was occurring. The correct optical counterpart was identified as the Be star He 3-640/Wray 793 by Chevalier & Ilovaisky (1975). The primary has been classified as O9.5IV-Ve (Janot-Pacheco et al. 1981), with strong Balmer emission lines indicating the presence of an extended envelope. According to Villada et al. (1992), the exact classification is complicated by many faint absorption and emission lines (mostly of Fe II), but the overall spectrum is found to be similar to that of the optical counterparts to other known Be/X-ray sources. The source was observed by Coe & Payne (1985) at UV wavelengths using the IUE satellite. They confirmed the identification of the counterpart and reported prominent UV lines characteristic of a Be star. Despite the large observational efforts made during last years and mainly after the 1991-1992 outburst, the Hen3-640/1A 118-615 system is still poorly understood. The orbital period of the system is unknown. Corbet's pulse period/orbital period diagram (Corbet 1986) gives an orbital period estimate of ~ 350 days.

1145-619. (V801 Cen, 2S 1145-61, 2S 1145-619, 2S 1145-62, LS 2502, 3U 1145-61, 4U 1145-62, 4U 1145-619, 4U 1145-61, 3A 1145-619, 2E 1145.5-6155, H 1147-62, H 1145-619) Initially observed by UHURU (together with 1145.1-9141). Two sources were distinguished by Einstein observatory (HEAO2). In Liu, van Paradijs & van den Heuvel (2000) the optical counterpart was classified as B1 Vne. Pulse fraction was obtained by BATSE (20-50 keV).

1249-637. (1H 1249-637, 2E 1239.8-6246, BZ Cru) Detected by HEAO1 (Wood et al. 1984). Probably a WD accretor.

1253-761. (1H 1253-761) Detected by HEAO1 (Wood et al. 1984). Probably a WD accretor.

1255-567. (1H 1255-567, μ^2 Cru) Detected by HEAO1 (Wood et al. 1984).

1258-613. (GX 304-1, 4U 1258-61, V850 Cen, H 1258-613, 2S 1258-613, 3A 1258-613) Discovered by UHURU. In Ziolkowski (2002) classified as B0.7Ve.

1417-624. (2S 1417-624, 2S 1417-62, 4U 1416-62, 2E 1417.4-6228, 3A 1417-624, H 1417-624) The X-ray source 2S 1417-62 was detected by SAS-3 in 1978 (Apparao et al. 1980). Analysis of the SAS 3 observations showed evidence of ~ 57 mHz pulsations (Kelley et al. 1981). Einstein and optical observations identified a Be star companion at a distance of 1.4-11.1 kpc (Grindlay et al. 1984). From the timing analysis of BATSE observations orbital parameters were determined and a correlation was found between spin-up rate and pulsed flux (Finger et al. 1996). Orbital period and eccentricity of the source were found to be 42.12 days and 0.446 respectively.

J1452.8-5949. (1SAX J1452.8-5949) 1SAX J1452.8-5949 was discovered during a BeppoSAX galactic plane survey in 1999 (Oosterbroek et al. 1999). Coherent pulsations were detected with a barycentric period of a 437.4 ± 1.4 s. The X-ray properties and lack of an obvious optical counterpart are consistent with a Be star companion at a distance of between approximately 6 and 12 kpc. Pulse fraction is high. It was determined in the BeppoSAX band 1.8-10 keV. Be/X-ray systems display a correlation between their spin and orbital periods (Corbet 1986) which in this case implies an orbital period of >200 days for 1SAX J1452.8-5949.

J1543-568. (XTE J1543-568) The transient X-ray source XTE J1543-568 was discovered by RXTE in 2000 (in't Zand et al. 2001b). A subsequent pointed PCA observation revealed a pulsar with a period of 27.12 ± 0.02 s. Later the pulsar was found in earlier data from BATSE on board the Compton Gamma-Ray Observatory. The orbital period is 75.56 ± 0.25 d. The mass function and position in the pulse period versus orbital period diagram are consistent with XTE J1543-568 being a Be/X-ray binary. The eccentricity is less than 0.03, so it is among the lowest for twelve Be/X-ray binaries whose orbits have now been well measured. This confirms the suspicion that small kick velocities of neutron stars in HMXBs are more common than expected (in't Zand et al. 2001b). Pulse fraction (RXTE) slightly depends on energy (from 2 to 20 keV).

1553-542. (2S 1553-542, 2S 1553-54, H 1553-542) The X-ray source 2S 1553-542 was discovered during observations with SAS 3 in 1975 (Kelley et al. 1983). Pulse fraction was determined by SAS-3 (2-11 keV).

1555-552. (1H 1555-552, LS 3417, RX J155422.2-551945, 2E 1550.3-5510, 1E 1550.4-5510) Detected by HEAO1 (Wood et al. 1984).

J170006-4157. (AX J170006-4157, AX J1700-419, AX J1700.1-4157) This source was discovered and observed three times between 1994 and 1997 by ASCA (Torii et al. 1999). Significant pulsations with P = 714.5 ± 0.3 s were discovered from the third observation. The X-ray spectrum is described by a flat power-law function with a photon index of 0.7. Although the spectrum could also be fitted by thermal models, the temperature obtained was unphysically high. The hard spectrum suggests that the source is a neutron star binary pulsar similar to X Persei (4U 0352+309), but it cannot be completely excluded the possibility that it is a white dwarf binary. Not marked as a Be-candidate in Liu, van Paradijs & van den Heuvel (2000). Pulse fraction in the range 0.7-10 keV was determined from the graph in Torii et al. (1999).

J1739-302. (XTE J1739-302, AX J1739.1-3020) This source was discovered in an observation of the black hole candidate 1E 1740.7-2942 with the proportional counter array (PCA) of the Rossi X-Ray Timing Explorer (Smith et al. 1998). Luminosity estimated for a 2-100 keV range with an assumption, that the source is at the Galactic center. Smith et al. (1998) tentatively identified XTE J1739-302 as a Be/NS binary because its spectral shape is similar to that of these systems: a gradual steepening over the 2-25 keV range.

J1739.4-2942. (RX J1739.4-2942) Discovered by ROSAT (Motch et al. 1998). Probably identical with GRS 1736-297.

J1744.7-2713. (RX J1744.7-2713, HD 161103, V3892 Sgr, LS 4356) Discovered by ROSAT (Motch et al. 1997). Luminosity was estimated for an energy range 0.1-2.4 keV. Pulsed fraction was taken from paper by Harmon et al. (2004). It has been obtained by BATSE in the range 20-40 keV.

J1749.2-2725. (AX J1749.2-2725) Discovered by ASCA (Torii et al. 1998). Not marked as a Be-candidate in Liu, van Paradijs & van den Heuvel (2000).

J1750-27. (GRO J1750-27, AX J1749.1-2639) GRO J1750-27 is the third of the new transient accretion-powered pulsars discovered using BATSE. A single outburst from GRO J1750-27 was observed with BATSE (see Scott et al. 1997). Pulsations with a 4.45 s period were discovered on 1995 July 29 from the Galactic center region as part of the BATSE all-sky pulsar monitoring program (Bildsten et al. 1997). An orbit with a period of 29.8 days was found by Scott et al. (1997). Large spin-up rate, spin period and orbital period together suggest that accretion is occurring from a disk and that the outburst is a “giant” one typical for a Be/X-ray transient system.

1820.5-1434. (AX 1820.5-1434) This X-ray source was discovered in 1997 by ASCA (Kinugasa et al. 1998). Pulsations with a period ∼ 152 s were detected in the 2-10 keV flux of the source with a pulsed fraction of ∼ 50%. The pulse fraction is not energy dependent. Both timing and spectral properties of AX 1820.5-1434 are typical for an accretion-driven X-ray pulsar. Israel et al. (2000) proposed O9.5-B0Ve star as an optical counterpart of the pulsar.

1843+00. (GS 1843+00) The transient X-ray source GS 1843+00 was discovered during the Galactic plane scan near the Scutum region by X-ray detectors on board the Ginga satellite (Turner et al. 1989). Coherent pulsations with a period of about 29.5 s were observed with a very small peak-to-peak amplitude of only 4 per cent of the average flux. Pulse fraction was obtained by BATSE (20-50 keV). Luminosity estimates are the follwoing: 1) $2 \cdot 10^{36}$ erg s^{-1} (20-200 keV, 10 kpc) (Machanda 1999); 2) $3 \cdot 10^{37}$ erg s^{-1} (0.3-100 keV, 10 kpc) (Piraino et al. 2000).

1845-024. (2S 1845-024, GS 1843-02, 4U 1850-03, 1A 1845-02, 1H 1845-024, 3A 1845-024, GRO J1849-03) The pulsar GS 1843-02 was discovered by Ginga in 1988 (Makino 1988) during a galactic plane scan conducted as part of a search for transient pulsars (see Finger et al. 1999). The same source is known as GRO J1849-03. X-ray outbursts occur regularly every 242 days. Finger et al. (1999) presented a pulse timing analysis that shows that the 2S 1845-024 outbursts occur near the periastron passage. The orbit is highly eccentric (e = 0.88 ± 0.01) with a period of 242.18 ± 0.01 days. The orbit and transient outburst pattern strongly suggest that the pulsar is in a binary system with a Be star. From the measured spin-up rates and inferred luminosities Finger et al. (1999) concluded that an accretion disc is present during outbursts.

J1858+034. (XTE J1858+034) The hard X-ray transient XTE J1858+034 was discovered with the RXTE All Sky Monitor in 1998 (Remillard & Levine 1998). The spectrum was found to be hard similar to spectra of X-ray pulsars. Observations were made immediately after this with the Proportional Counter Array (PCA) of the RXTE and regular pulsations with a period of 221.0 ± 0.5 s were discovered (Takeshima et al. 1998). The pulse profile is found to be nearly sinusoidal with a pulse fraction of ∼ 25%. From the transient nature of this source and pulsations they suggested that this is a Be-X-ray binary. The position of the X-ray source was refined by scanning the sky around the source with the PCA (Marshall et al. 1998). From the RXTE target of opportunity (TOO) public archival data of the observations of XTE J1858+034, made in 1998, Paul & Rao (1998) have discovered the presence of low frequency QPOs. Pulse fraction was obtained by RXTE (2-10 keV).

1936+541. (1H 1936+541) Detected by HEAO1 (Wood et al. 1984).

J1946+274. (XTE J1946+274, GRO J1944+26, 3A 1942+274, SAX J1945.6+2721) Pulse fraction obtained by Indian X-ray Astronomy Experiment - IXAE (2-18 keV). Coburn et al. (2002) present a data on cyclotron feature in the spectrum of J1946+274 which corresponds to the field $\sim 3.9 \cdot 10^{12}$ G. Wilson et al. (2003) propose a distance 9.5 ± 2.9 kpc basing on a correlation between measured spin-up rate and flux.

J1948+32. (GRO J1948+32, GRO J2014+34, KS 1947+300) Discovered by BATSE (see Chakrabarty et al. 1995). Galloway et al. (2004) presented results which can indicate a glitch in that system.

2030+375. (EXO 2030+375, V2246 Cyg) EXO 2030+375 was discovered in 1985 May with EXOSAT satellite during a large outburst phase (Parmar et al. 1989). This outburst was first detected at a 1-20 keV energy band and its luminosity is close to the Eddington limit (assuming 5 kpc distance to the source) for a neutron star (Parmar et al. 1985). The X-ray emission of the transient pulsar EXO 2030+375 is modulated by ∼ 42 s pulsations and periodic ∼ 46 days Type I outbursts, that are produced at each periastron passage of the neutron star, i.e. when the pulsar interacts with the disk of the Be star. Not marked as a Be-candidate in Liu, van Paradijs & van den Heuvel (2000). See a detailed description in Wilson et al. (2002). Pulse fraction was obtained by BATSE in the range 30-70 keV (see Harmon et al. 2004).

J2030.5+4751. (RX J2030.5+4751, SAO 49725) Discovered by ROSAT (see Motch et al. 1997). This object is marked as a likely Be/X-ray candidate in Liu, van Paradijs & van den Heuvel (2000), but not in many other papers. The pointing data show that the X-ray source is relatively hard. The L_x/L_{bol} ratio is close to $3 \cdot 10^{-6}$. This is rather strong evidence for an accreting compact object around SAO 49725 (Motch et al. 1997).

J2058+42. (GRO J2058+42) GRO J2058+42, a transient 198 s X-ray pulsar. It was discovered by BATSE during a “giant” outburst in 1995 (see Wilson et al. 1998). The pulse period decreased from 198 to 196 s during the 46 day outburst. BATSE observed five weak outbursts from GRO J2058+42 that were spaced by about 110 days. The RXTE All-Sky Monitor detected eight weak outbursts with approximately equal durations and intensities. GRO J2058+42 is most likely a Be/X-ray binary that appears to produce outbursts at periastron and apastron. No optical counterpart has been identified to date (see however Castro-Tirado 1996), and no X-ray source was present in the error circle in archival ROSAT observations (Wilson et al. 1998). Pulse fraction was obtained by BATSE in the range 20-70 keV (see Harmon et al. 2004 for details).

J2103.5+4545. (SAX J2103.5+4545) SAX J2103.5+4545 is a transient HMXB pulsar with a ∼ 358 s pulse period discovered with the WFC on-board BeppoSAX during an outburst in 1997 (Hulleman et al. 1998). Its orbital period of 12.68 days has been found with the RXTE during the 1999 outburst (Baykal et al. 2000). The likely optical counterpart, a Be star with a magnitude V=14.2, has been recently discovered (Reig & Mavromatakis 2003). During the outburst in 1999 Baykal et al. (2002) for the first time observed with RXTE a transition from the spin-up phase to the spin-down regime, while the X-ray flux was declining. Inam et al. (2004) observed a soft spectral component (blackbody with a temperature of 1.9 keV) and a transient 22.7 s QPO during a XMM-Newton observation performed in 2003.

2138+568. (GS 2138-56, Cep X-4, V490 Cep, 1H 2138+579, 4U 2135+57, 3A 2129+571) The X-ray source Cep X-4 was discovered with a transient high level X-ray flux in 1972 by OSO-7 (Ulmer et al. 1973). The source was not detected again till 1998 when a new outburst was detected by GINGA. During these observations coherent 66 s pulsations were discovered revealing an X-ray pulsar with a complex X-ray spectrum including a possible 30 keV cyclotron absorption feature (Koyama et al. 1991, Mihara et al. 1991). Cep X-4 has been associated with a Be star that lies within the ROSAT error box. A cyclotron line was detected by Mihara et al. (1991), it corresponds to the magnetic field $B = 2.3 \cdot 10^{12}(1 + z)$ G. Pulse fraction strongly depends on energy and is highly variable with time from nearly 0 up to $>$ 80% (see Wilson et al. 1999b). RXTE pulse fraction is decreasing with intensity.

2206+543. (3U 2208+54, 4U 2206+54, 1H 2205+538, 1A 2204+54, 3A 2206+543) The hard X-ray source 4U 2206+54 was first detected by the Uhuru satellite (Giacconi et al. 1972). The source is included in the Ariel V catalogue as 3A 2206+543 (Warwick et al. 1981). 4U 2206+54 has been detected by all satellites that have pointed at it and has never been observed to undergo an outburst. Steiner et al. (1984) used the refined position from the HEAO-1 Scanning Modulation Collimator to identify the optical counterpart with the early-type star BD +53° 2790. From their photometry, they estimated that the counterpart was a B0 - 2e main sequence star, and therefore concluded that the system was a Be/X-ray binary. Corbet, Remillard & Peele (2000) have announced the detection of a 9.570 ± 0.004 d periodicity in the X-ray lightcurve. If this is the binary period, then it would be the shortest known for a Be/X-ray binary — unless the ∼ 1.4 d periodicity in the optical lightcurve of RX J0050.7-7316 (Coe & Orosz 2000). Optical and ultraviolet spectroscopy of the optical component BD +53° 2790 show it to be a very peculiar object, displaying emission in H I, He I and He II lines and variability in the intensity of many lines of metals (Negueruela & Reig 2001). Strong wind troughs in the UV resonance lines suggest a large mass loss rate. These properties might indicate that the star displays at the same time the Of and Oe phenomena or even a hint of the possibility that it could be a spectroscopic binary consisting of two massive stars in addition to the compact object (Negueruela & Reig 2001). With all certainty there is an O9.5V star in the system which is probably a mild Of star, and which likely feeds the compact object with its stellar wind (Negueruela & Reig 2001). See also recent data and discussion in (Corbet & Peele 2001). These authors confirm the orbital period of ∼ 9.6 days. This value is surprisingly short if one takes into account long spin period of the NS (see fig. 2, where this system is definitely displaced from the normal trend). Spin period was not detected in many observations. Corbet & Peele (2001) discuss several possibilities other than Be/X-ray interpretation including an accreting WD. Nearly perfect alignment between magnetic and spin axis is also a possibility.

2214+589. (1H 2214+589) Detected by HEAO1 (Wood et al. 1984). This object is mentioned in Liu, van Paradijs & van den Heuvel (2000) as a Be-candidate. However, it is not mentioned in many lists of Be/X-ray systems (for example in Ziolkowski 2002). Not much is known about this source.

J2239.3+6116. (3A 2237+608, SAX J2239.3+6116, SAX J2239.2+6116, 3U 2233+59, 4U 2238+60) Discovered by BeppoSAX (see in’t Zand et al. 2001a). SAX J2239.3+6116 is an X-ray transient which often recurs with a periodicity of 262 d (in’t Zand et al. 2000). Because of the Be-star nature of the likely optical counterpart the periodicity may be identified with the orbital period of the binary. Pulse fraction

was determined from the graph in in't Zand et al. (2001a) as $(I_{\rm max} - I_{\rm min})/(I_{\rm max} + I_{\rm min})$. It corresponds to the energy range $\sim 1 - 10$ keV. $L_{\rm max}$ corresponds to the distance 4.4 kpc and the highest flux 10^{-9} erg cm^{-2}s^{-1} in the energy range 2-28 keV (in't Zand et al. 2001a).

3. Graphs and discussion

In this section we give a graphical representation of the data. In the first figure we show a usual period – luminosity dependence. If luminosity is proportional to $\dot{M}$ – an accretion rate – then for each value of L it is possible to determine a critical period, $P_{\rm A}$ (see details on the magnetorotational evolution of neutron stars for example in Lipunov 1992). It is determined by an equality of the magnitospheric radius to the corotation radius, so $P_{\rm A}$ depends also on the magnetic field of a neutron star. If a spin period of a NS is shorter than $P_{\rm A}$ then accretion rate is significantly reduced, and the NS is at the stage of *propeller*. Lines for $P_{\rm A}$ for two values of the magnetic field are shown in the figure. Situation can be more complicated for low accretion rates when the so-called *subsonic propeller* stage becomes important. In that case for a neutron star it is necessary to slow down to a new critical period $P_{\rm crit}$. Lines for this quantity are also shown (see figure caption for other details).

In the second figure we present the so-called "Corbet diagram" (Corbet 1986). For most of Be/X-ray binaries correlation between spin and orbital periods is strong, so that this dependence is even used to estimate orbital periods when only spins are known.

Pulse profiles contain a lot of important information about accretors. The simplest characteristic of a pulse profile is its pulse fraction. Therefore it is useful to look if there are correlations of this quantity with other parameters. In the next three figures we plot pulse fraction vs. spin period and luminosity. Pulse fraction usually is energy dependent. In the tables for several objects we give maximal and minimal values of measured pulse fraction. In the figures 3 and 4 in these cases we plot two points corresponding to upper and lower limits given in the table.

As it is clear form the fig. 3 pulse fraction is not correlated with the maximal luminosity. Also there is no correlation between spin period and pulse fraction at least for not very long (<300 s) spins. If there is any correlation between spin period and pulse fraction for long periods is less clear due to small statistics (see figs. 4 and 5). It would be interesting to have larger statistics on pulse fraction for systems with long orbital periods in connection with discussion in the paper by Li & van den Heuvel (1996).

The observational number distribution of Be/X-ray binaries over orbital characteristics is shown in figs. 6 and 7. It is seen that Be-systems do not have orbital periods longer than one year. There is a lack of systems with periods 10–20 days. As it was shown in the paper by Raguzova & Lipunov (1998) the lack of short-period Be/X-ray binaries can be explained by the effect of tidal synchronization in binaries. The peak of the observed number distribution of Be/X-ray systems over eccentricities falls in the range 0.4 – 0.5. In order to get a better agreement with the observed parameters of Be/X-ray binaries there is no necessity of high kicks. Moderate recoil velocities of the order 50 km s^{-1} are enough (see Raguzova & Lipunov 1998).

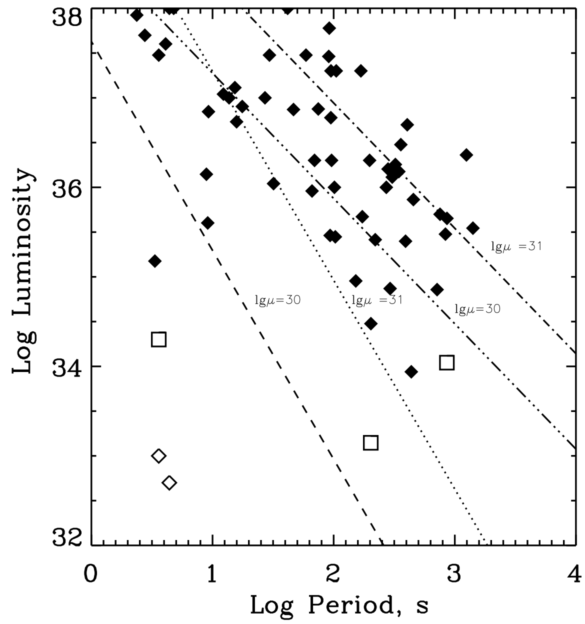

Fig. 1. Period – Luminosity. Open symbols correspond to the quiescent state of the X-ray pulsar. Squares represent three sources in quiescence from which pulsations were observed (4U 0115+63 – Campana et al. 2001; RX J0440.9+4431 and RX J1037.5-564 – Reig, Roche 1999b). Open diamonds show objects without pulsations in quiescence, which are supposed to be in the *propeller* state (4U 0115+63 and V0332+53 – Campana et al. 2002). The graph is artifitially cutted at $\log p = 0$ and $\log L = 38$. So, here we do not plot two systems with the most fastly rotating NSs: J0635+0533 (small luminosity) and 0535-668 (large luminosity). Dashed and dotted lines correspond to the critical period, $P_{\rm A} = 2^{5/14}\pi(GM)^{-5/7}(\mu^2/\dot{M})^{3/7}$, for two values of the magnetic moment, $\mu = 10^{30}$ G cm^3 and 10^{31} G cm^3. The two dashed-dotted lines correspond to subsonic propeller – accretor transition for the same two values of the magnetic moment which occurs at $P_{\rm crit} = 81.5\mu_{30}^{16/21}L_{36}^{-5/7}$ according to Ikhsanov (2003). We note that the multiplicative coefficient in Ikhsanov's formula is larger than in the classical formula of Davies, Pringle (1981) by a factor ~ 7.5.

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References

Aoki, T., Dotani, T., Ebisawa, K., et al., 1992, PASJ, 44, 641
Apparao, K.M.V., Naranan, S., Kelley, R.L. et al., 1980, A&A 89,249
Baykal, A., Stark, M.J., & Swank, J.H., 2000, ApJ, 544, 129
Baykal, A., Stark, M.J., & Swank, J.H., 2002, ApJ, 569, 903
Bildsten, L., Chakrabarty, D., Chiu, J., et al. 1997, ApJS 113, 367

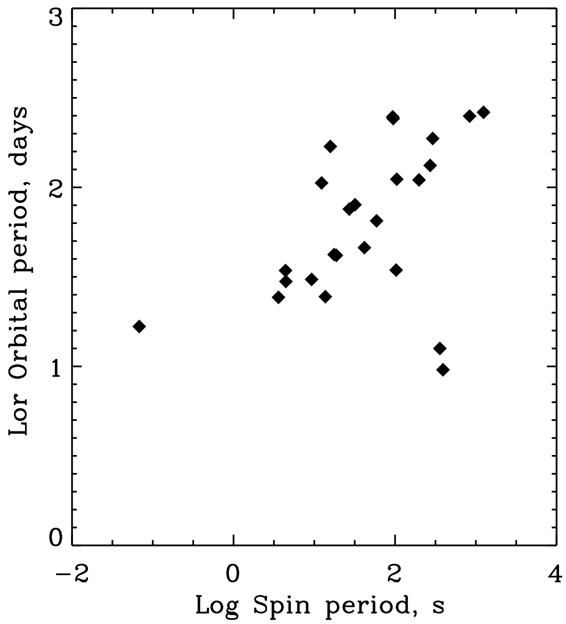

Fig. 2. Spin period – Orbital period. Three displaced systems are: 2206+543 (large spin and short orbital periods), 2103.5+4545 (large spin and short orbital periods) and 0535-668 (very short spin period).

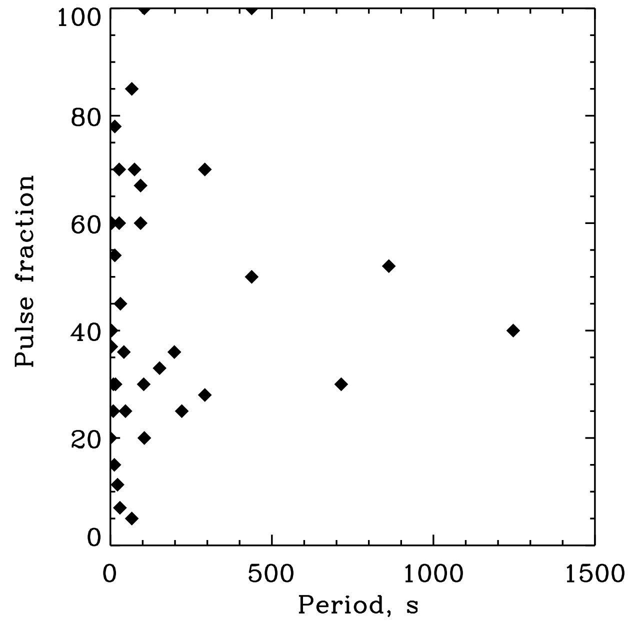

Fig. 4. Spin period – Pulse fraction. If there is deficit of high and low pulse fraction at long spin periods is unclear due to small statistics.

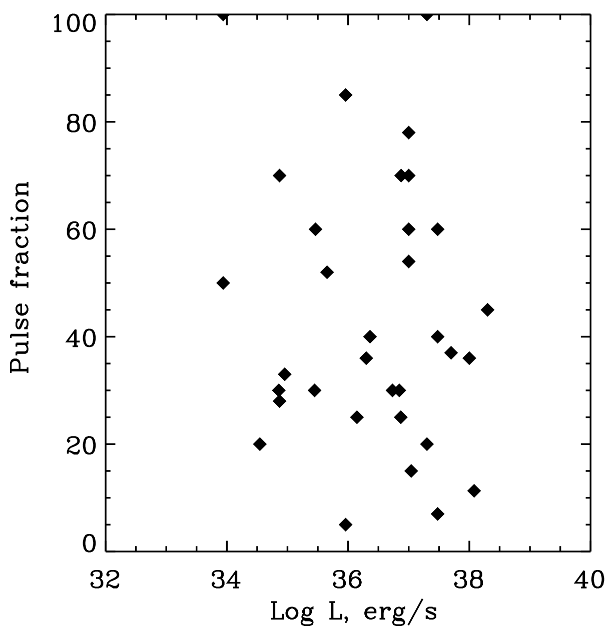

Fig. 3. Luminosity – Pulse fraction.

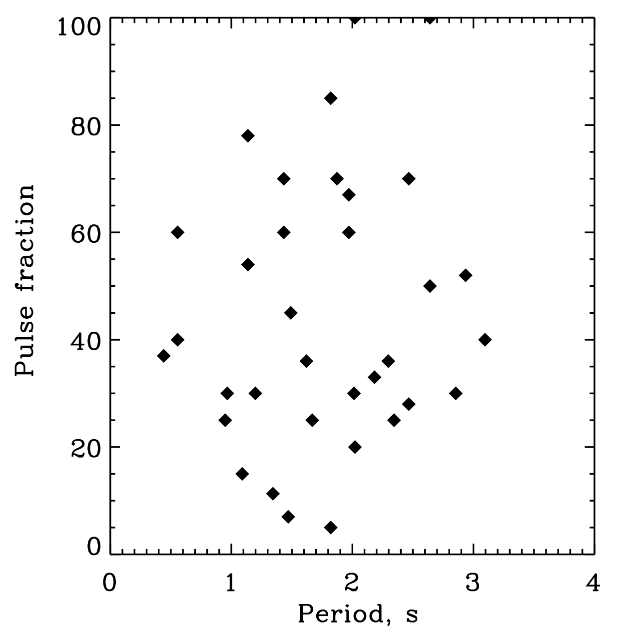

Fig. 5. Spin period – Pulse fraction. Data is the same as in the previous figure, but spin periods are given in a logarithmic scale.

Borkus, V. V., Kaniovsky, A. S., Sunyaev, R. A., et al. 1998, Astronomy Letters, Volume 24, Issue 3, May 1998, pp.350-360

Buckley, D.A.H., Coe, M.J., Stevens, J.B., et al. 1998, IAUC 6789, 1

Buckley, D.A.H., Coe, M.J., Stevens, J.B., et al. 2001, MNRAS 320, 281

Burderi, L., Di Salvo, T., Robba, N.R., et al. 1998, ApJ 498, 831

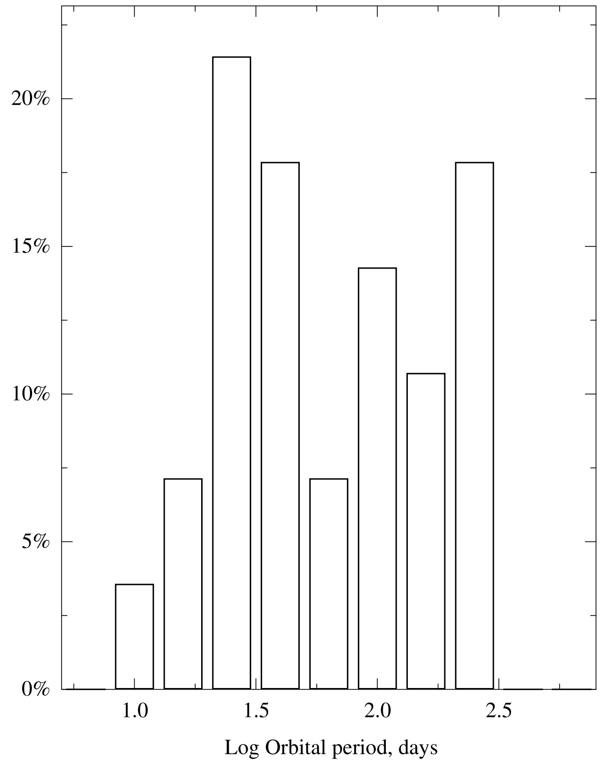

Fig. 6. The observational number distribution of Be/X-ray binaries over orbital period.

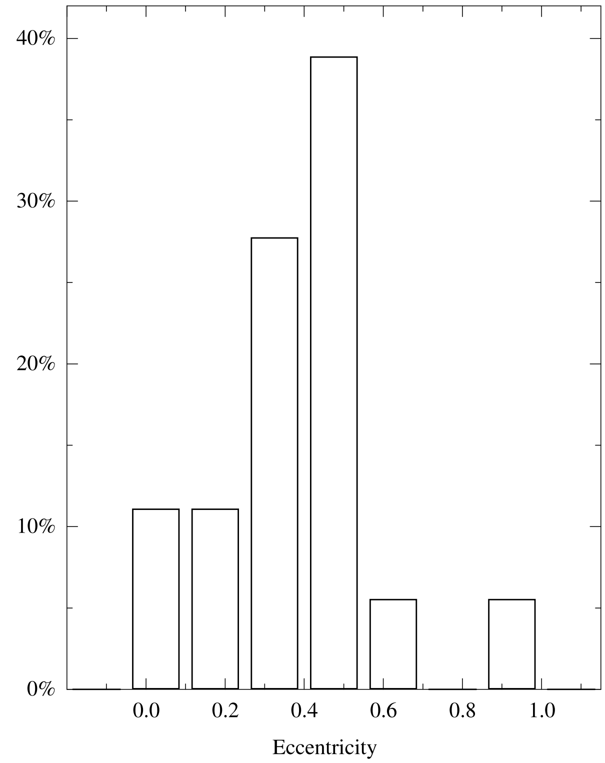

Fig. 7. The observational number distribution of Be/X-ray binaries over orbital eccentricity

Campana, S., Gastaldello, F., Stella, L., et al. 2001, ApJ 561, 924
Campana, S., Stella, L., Israel, G. L., et al. 2002, ApJ 580, 389
Castro-Tirado, A.J. 1996, IAUC 6516
Chakrabarty, D., Koh, T., Bildsten, L., et al. 1995, ApJ 446, 826
Chakrabarty, D., Levine, A.M., Clark, G.W., et al. 1998, IAUC 7048, 1
Chakrabarty, D., Takeshima, T., Ozaki, M., et al. 1998, IAUC 7062, 1
Charles, P.A., Booth, L., Densham, R.H., et al. 1983, MNRAS 202, 657
Chevalier, C., & Ilovaisky, S.A., 1975, IAUC 2778, 1
Clark, G., Doxsey, R., Li, F., et al. 1978, ApJ 221, L37
Clark, G.W., Remillard, R.A., & Woo, J.W. 1996, IAUC 6282, 1
Clark, G.W., Remillard, R.A., & Woo, J.W. 1997, ApJ 474, 111
Coburn, W., Heindl, W.A., Gruber, D.E., et al. 2001, ApJ 552, 738
Coburn, W., Rotschild, R.E., & Heindl, W.A. 2000, IAUC 7487, 1
Coburn, W., Heindl, W. A., Rothschild, R. E., et al. 2002, ApJ 580, 394
Coe, M.J., & Edge, W.R.T. 2004, astro-ph/0402031
Coe, M.J., Haigh, N.J., Laycock, S.G.T., et al. 2002, MNRAS 332, 473
Coe, M.J., Haigh, N.J., & Reig, P. 2000, MNRAS 314, 290
Coe, M.J., Negueruela, I., Buckley, D.A.H., et al. 2001, MNRAS 324, 363
Coe, M.J., & Orosz, J.A., 2000, MNRAS 311, 169
Coe, M.J., & Payne, B.J., 1985, Ap&SS 109, 175
Coe, M.J., Roche, P., Everall, C., et al. 1994, A&A 289, 784
Cook, K., 1998, IAUC 6860, 1
Cominsky, L., Clark, G. W., Li, F., et al. 1978, Nat 273, 367
Corbet, R., 1986, MNRAS 220, 1047
Corbet, R.H.D., & Peele, A.G. 1997, ApJ 489, L83
Corbet, R.H.D., & Peele, A.G. 2000, ApJ 530, L33
Corbet, R.H.D., & Peele, A.G. 2001, ApJ 562, 936
Corbet, R., & Marshall, F. E. 2000, IAUC 7402, 3
Corbet, R., Marshall, F. E., Lochner, J.C., et al. 1998, IAUC 6788, 1
Corbet, R. H. D., Marshall, F. E., Coe, M. J., et al. 2001, ApJ 548, L41
Corbet, R. H. D., Marshall, F. E., & Markwardt, C.B. 2001, IAUC 7562, 1
Corbet, R.H.D., Remillard, R., & Peele, A.G. 2000, IAUC 7446
Corbet, R. H. D., Smale, A. P., Charles, P. A., & Southwell, K. A. 1995, BAAS 186, 4807
Corcoran, M.F., Waldron, W.L., MacFarlane, J.J., et al. 1994, ApJ 436, L95

Covino, S., Negueruela, I., Campana, S., et al. 2001, A&A 374, 1009
Cowley, A.P., Crampton, D., Hutchings, J.B., et al. 1984, ApJ 286, 196
Cowley, A.P., & Schmidtke, P.C. 2003, AJ 126, 2949
Cowley, A.P., Schmidtke, P.C., McGrath, T.K., et al. 1997, PASP 109, 21
Cusumano, G., Maccarone, M. C., Nicastro, L., Sacco, B., Kaaret, P. 2000, ApJ 528, L25
Davies, R.E., & Pringle, J.E. 1981, MNRAS 196, 209
Delgado-Marti, H., Levine, A.M., Pfahl, E., & Rappaport, S.A. 2001, ApJ 546, 455
Edge, W. R. T., & Coe, M. J. 2003, MNRAS 338, 428
Edge, W. R. T., Coe, M. J., Galache, J. L., & Hill, A.B. 2004, astro-ph/0401537
Eyles, C.J., Skinner, G.K., Wilmore, A.P., & Rosenberg, F.D., 1975, Nat 254, 577
Fabregat, J., Reglero, V., Coe, M. J., et al. 1992, A&A 259, 522
Filipović, M.D., Haberl, F., Pietsch, W., & Morgan, D.H. 2000, A&A 353, 129
Filipović, M.D., Pietsch, W., & Haberl, F. 2000, A&A 361, 823
Finger, M.H., Bildsten, L., Chakrabarty, D., et al. 1999, ApJ 517, 449
Finger, M.H., Wilson, R.B., Chakrabarty, D., 1996, A&ASS 120, 209
Forman, W., Jones, C., Cominsky, L., et al. 1978, ApJS 38, 357
Forman, W., Tananbaum, H., & Jones, C. 1976, ApJ 206, 29
Frontera, F., dal Fiume, D., Morelli, E., & Spada, G. 1985, ApJ 298, 585
Galloway, D.K., Morgan, E.H. & Levine, A.M. 2004, astro-ph/0401476
Garmany, C.D., & Humphreys, R.M. 1985, AJ 90, 2009
Giacconi, R., Murray, S., Gursky, H., et al. 1972, ApJ 178, 281
Gregory, P.C. 1999, ApJ 520, 361
Gregory, P.C., Xu, H.J., Backhouse, C.J., & Reid, A., 1989, ApJ 339, 1054
Grebenev, S. & Sunyaev, R., 1991, IAU Circ. 5294
Grindlay, J.E., Petro, L.D., & McClintock, J.E., 1984, ApJ 276, 621
Haberl F., Angelini L., & Motch C. 1998, A&A 335, 587
Haberl, F., Dennerl, K., & Pietsch, W. 1995, A&A 302, L1
Haberl, F., Dennerl, K., Pietsch, W., & Reinsch, K. 1997, A&A 318, 494
Haberl, F., Filipovic, M.D., Pietsch, W., & Kahabka, P. 2000, A&AS 142, 41
Haberl, F., & Pietsch, W. 1999, A&A 344, 521
Haberl, F., & Sasaki, M. 2000, A&A 359, 753
Harmanec, P., Habuda, P., Steel, S., et al. 2000, A&A 364, 85
Harmon, B.A., et al. 2004, astro-ph/0404453
Hasinger, G., Pietsch, W., & Belloni, T., 1990, IAU Circ. 5142
Heindl, W.A., & Coburn, W. 1999, IAUC 7126, 2
Horaguchi, T., Kogure, T., Hirata, R., et al. 1994, PASJ 46, 9
Hughes, J.P. 1994, ApJ 427, L25
Hughes, J.P., & Smith, R. C. 1994, AJ 107, 1363
Hulleman, F., in 't Zand, J.J.M., & Heise, J., 1998, A&A, 337, L25
Hutchings J.B., & Crampton D. 1981, PASP 93, 486
Hutchings, J.B., & Crampton, D. 1981, ApJ 247, 222
Ikhsanov, N.R. 2003, A&A 399, 1147
Imanishi, K., Yokogawa, J., & Koyama, K. 1998, IAUC 7040, 1
Imanishi, K., Yokogawa, J., Tsujimoto, M., & Koyama, K. 1999, PASJ 51, L15
Inam, S.C., Baykal, A., Swank, I, & Stark, M.J., 2004, ApJ, submitted, astro-ph/0402221
in't Zand, J. J. M., Halpern, J., Eracleous, M., et al. 2000, A&A 361, 85
in't Zand, J. J. M., Swank, J., Corbet, R. H. D., & Markwardt, C. B. 2001a, A&A 380, L26
in't Zand, J. J. M., Corbet, R. H. D., & Marshall, F.E. 2001b, ApJ 553, L165
Israel, G.L., Covino, S., Campana, S., et al. 2000, MNRAS 314, 87
Israel, G. L., Stella, L., Angelini, L., et al. 1995, IAUC 6277, 1
Israel, G. L., Stella, L., Angelini, L., et al. 1997, ApJ 484, 141
Israel, G. L., Stella, L., Campana, S., et al. 1998, IAUC 6999, 1
Israel, G. L., Covino, S., & Polcaro, V. F. 2000, In: Smith M., Henrichs H. (eds.) The Be Phenomenon in Early-Type Stars. IAU Colloquium 175, ASP Conference Proceedings, Vol. 214, p.739
Israel, G.L., Negueruela, I., Campana, S. et al. 2001, A&A 371, 1018
Ives, J.C., Sanford, P.W., & Bell-Burnell, S.J., 1975, Nat 254, 580
Janot-Pacheco, E., Ilovaisky, S.A., & Chevalier, C, 1981, A&A 99, 271
Jeong, J. H. 2003, Information Bulletin on Variable Stars 5392, 1
Johns, M., Koski, A., Canizares, C., & McClintock, J. 1978, IAUC 3171, 1
Johnston, M., Bradt, H., Doxsey, R., et al. 1978, ApJ 223, 71
Johnston, M. D., Bradt, H. V., & Doxsey, R. E. 1979, ApJ 233, 514
Kaaret, P., Piraino, S., Halpern, J., & Eracleous, M. 1999, ApJ 523, 197
Kahabka, P. 1999, IAUC 7082, 1
Kahabka, P. 1999, IAUC 7087, 1
Kahabka, P., & Pietch, W. 1996, A&A 312, 919
Kahabka, P., & Pietch, W. 1998, IAUC 6840, 1
Kelley, R.L, Apparao, K.M.V, Doxsey, R.E. et al., 1981, ApJ 243, 251
Kelley, R.L., Rappaport, S., Ayasli, S. 1983, ApJ 274, 765
Kinugasa, K., Torii, K., Hashimoto, Y., et al. 1998, ApJ 495, 435
Kohno, M., Yokogawa, J., & Koyama, K. 2000, PASJ 52, 299
Koyama K., Kawada M., Tawara Y., et al., 1991, ApJ 366, L19
Koyama, K., Maeda, Y., Tsuru, T., et al. 1994, PASJ 46, L93
Kubo, S., Murakami, T., Ishida, M., & Corbet, R.H.D. 1998, PASJ 50, 417
Kylafis, N.D. 1996, in Supersoft X-ray Sources, ed. J. Greiner, Lecture Notes in Physics 472, 41 (Springer, Berlin)
Lamb, R.C., Prince, T.A., Macomb, D.J., & Finger M.H. 1999, IAUC 7081, 1
Laycock, S., Corbet, R.H.D., Coe, M.J., et al. 2003, MNRAS 339, 435

Laycock, S., Corbet, R.H.D., Perrodin, D., et al. 2002, A&A 385, 464
Li, F., Clark, G. W., Jernigan, J. G., & Rappaport, S. 1979, ApJ 228, 893
Li, F., Jernigan, G., & Clark, G. 1977, IAUC 3125, 1
Li, X.-D., & van den Heuvel, E.P.J. 1996, A&A 314, L13
Lipunov, V.M. 1992, "Astrophysics of neutron stars", Springer-Verlag
Liu, Q.Z., van Paradijs, J., & van den Heuvel, E.P.J. 2000, A&AS 147, 25
Lochner, J. C. 1998, IAUC 7007, 2
Lochner, J. C., Marshall, F. E., Whitlock, L. A., & Brandt, N. 1998, IAUC 6814, 1
Lochner, J. C., Whitlock, L. A., Corbet, R. H. D., & Marshall, F. E. 1999, BAAS 31, 905
Lyubimkov, L. S., Rostopchin, S. I., Roche, P., & Tarasov, A. E. 1997, MNRAS 286, 549
Macomb, D. J., Fox, D. W., Lamb, R. C., & Prince, T. A. 2003, ApJ 584, L79
Macomb, D. J., Finger, M., Harmon, A., et al. 1998, BAAS 31, 670
Macomb, D. J., Finger, M., Harmon, A., et al. 1999, ApJ 518, L99
Makishima, K., Kawai, N., Koyama, K., et al. 1984, PASJ 36, 679
Makishima, K., Mihara, T., Nagase, F., & Tanaka, Y. 1999, ApJ 525, 978
Makino, F. 1988, IAUC 4661, 2
Makino, F., 1990a, IAU Circ. 5142
Makino, F., 1990b, IAU Circ. 5139
Makino, F., 1990c, IAU Circ. 5148
Manchanda, R.K. 1999, MNRAS 305, 409
Marshall, F. E., Boldt, E. A., Holt, S. S., et al. 1979, ApJS 40, 657
Marshall, F. E., Lochner, J. C., Santangelo, A., et al. 1998, IAUC 6818, 1
Marshall, F. E., Lochner, J. C., & Takeshima, T. 1997, IAUC 6777, 1
Mason, K.O., White, N.E., & Sanford, P.W. 1976, Nat 260, 690
Mavromatakis, F., Haberl, F., 1993, A&A 274, 304
McGowan, K. E., & Charles, P. A. 2002, MNRAS 335, 941
Mereghetti S., Stella L., & De Nile F. 1993, A&A 278, L23
Mihara, T., Makishima, K., Kamijo, S., et al. 1991, ApJ 379, L61
Mook, D.E., Boley, F.I., Foltz, C.B., & Westpfahl, D. 1974, PASP 86, 894
Motch, C., Guillout, P., Haberl, F., et al. 1998, A&AS 132, 341
Motch, C. Haberl, F. Dennerl, K., Pakull, M., Janot-Pacheco, E. 1997, A& A 323, 853
Motch C., Belloni T., Buckley D., et al. 1991, A&A 246, L24
Motch C., Janot-Pacheco E., Pakull M.W., & Mouchet M, 1988, A& A 201,63
Murakami, T., Koyama, K., Inoue, H., & Agrawal, P.C. 1986, ApJ 310, L31
Murdin, P., Morton, D. C., & Thomas, R. M. 1979, MNRAS 186, 43
Negueruela, I., & Coe, M.J. 2002, A&A 385, 517
Negueruela, I., & Okazaki, A.T. 2001a, A&A 369, 108
Negueruela, I., Okazaki, A.T. 2001b, astro-ph/0011406
Negueruela, I., & Reig, P., 2001, A&A 371, 1056
Negueruela, I., Reig, P., Buckley, D.A.H., et al. 1996, A&A 315, 160
Negueruela, I., Reig, P., Finger, M. H., & Roche, P. 2000, A&A 356, 1003
Negueruela, I., Roche, P., Fabregat, J., & Coe, M. J. 1999, MNRAS 307, 695
Oosterbroek, T., Orlandini, M., Parmar, A., et al. 1999, A&A 351, L33
Pakull, M, Brunner, H., Pietsch, W., et al. 1985, Space Sci. Rev. 40, 371
Parmar, A. N., Stella, L., Ferri, P., & White, N. E. 1985, IAU Circ. 4066
Parmar, A. N., White, N. E., Stella, L., Izzo, C, & Ferri, P. 1989, ApJ, 338, 359
Paul, B., Agrawal, P.C. Mukerjee, K., Rao, A.R., Seetha, S., & Kasturirangan, K. 2001, A&A 370, 529
Paul, B., & Rao, A.R. 1998, A&A 337, 815
Perryman, M.A.C., Lindegren, L., Kovalevski, J., et al. 1997, A&A 323, L49
Petre, R., & Gehrels, N. 1994, A&A 282, L33
Piraino, S., Santangelo, A., Segreto, A. et al. 2000, A&A 357, 501
Raguzova, N.V., & Lipunov, V.M. 1998, A&A 340, 85
Rappaport, S., Clark, G. W., Cominsky, L., et al. 1978, ApJ 224, L1
Reid, N., Glass, I.S., & Catchpole, R.M. 1988, MNRAS 232, 53
Reig, P., & Mavromatakis, F., 2003, Atel 173
Reig, P., Negueruela, I., Coe, M. J., et al. 2000, MNRAS 317, 205
Reig, P., Roche, P. 1999a, MNRAS 306, 95
Reig, P., & Roche, P. 1999b, MNRAS 306, 100
Reig, P., Negueruela, I., Buckley, D. A. H., Coe, M. J., Fabregat, J., Haigh, N. J. 2001, A&A 367, 266
Reig, P., Negueruela, I., Fabregat, J., 2004, astro-ph/0404121
Remillard R., & Levine A., 1998, IAUC 6826
Robinson, R.D, & Smith, M.A., 2000, ApJ 540, 474
Roche, P., Coe, M. J., Fabregat, J., et al. 1993, A&A 270, 122
Roche, P., Larionov, V., Tarasov, A. E., et al. 1997, A&A 322, 139
Rose, L. A., Marshall, F. E., Holt, S. S., et al. 1979, ApJ 231, 919
Rosenberg, F. D., Eyles, C. J., Skinner, G. K., & Willmore, A. P. 1975, Nat 256, 628
Santangelo, A., Cusumano, G., dal Fiume, D., et al. 1998, A&A 338, L59
Sasaki, M., Haberl, F., Keller, S., & Pietsch, W. 2001, A&A 369, 29
Sasaki, M., Pietsch, W., & Haberl, F. 2003, A&A 403, 901
Schmidtke, P.C., Cowley, A.P., Frattare, L.M., et al. 1994, PASP 106, 843
Schmidtke, P.C., Cowley, A.P., McGrath, T.K., & Anderson, A.L. 1995, PASP 107, 450
Schmidtke, P. C., Cowley, A. P., Hauschildt, P. H., et al. 1996, PASP 108, 668

Schmidtke, P.C., Cowley, A.P., Crane, J.D., et al. 1999, AJ 117, 927

Scott, D.M., Finger, M. H., Wilson, R.B., et al. 1997, ApJ 488, 831

Seward, F. D., & Mitchell, M. 1981, ApJ 243, 736

Skinner, G.K., Shulman, S., Share, G., et al. 1980, ApJ 240, 619

Skinner, G.K., Bedford, D.K., Elsner, R.F., et al. 1982, Nat 297, 568

Slettebak, A. 1982, ApJS 50, 55

Smith, D. M., Main, D., Marshall, F., et al. 1998. ApJ 501, L181

Soria, R. 1999, PASA 16, 147

Southwell, K. A. & Charles, P. A. 1996, MNRAS 281, L63

Steiner, J.E., Ferrara, A., Garcia, M. et al. 1984, ApJ 280, 688

Stella, L., White, N. E., Davelaar, J., et al. 1985, ApJ 288, L45

Stella, L., White, N. E., & Rosner, R. 1986, ApJ 308, 669

Stevens, J.B., Coe, M.J., & Buckley, D.A.H. 1999, MNRAS 309, 421

Takeshima, T., Corbet, R. H. D., Marshall, F. E., et al. 1998, IAUC 6826

Tamura, K., Tsunemi, H., Kitamoto, S., et al. 1992, ApJ 389, 676

Tapia M., Costero R., Echevarra J., & Roth M., 1991, MNRAS 253, 649

Telting, J. H., Waters, L. B. F. M., Roche, P., et al. 1998, MNRAS 296, 785

Torii, K., Kinugasa, K., Katayama, K., et al. 1998, ApJ 508, 854

Torii, K., Sugizaki, M., Kohmura, T., et al. 1999, ApJ 523, 65

Torii, K., Kohmura, T., Yokogawa, J., & Koyama, K. 2000, IAUC 7441, 2

Turner, M.J.L., Thomas, H.D., Patchett, B.E., et al. 1989, PASJ 41, 345

Ueno, M., Yokogawa, J., Imanishi, K., & Koyama, K. 2000a, PASJ 52, L63

Ueno, M., Yokogawa, J., Imanishi, K., & Koyama, K. 2000b, IAUC 7442, 1

Ulmer M.P., Baity W., Wheaton W. et al. 1973, ApJ 184, L117

Villada, M., Giovannelli, R, & Polcaro, V.F., 1992, A&A 259, LI

van der Klis, M., Tuohy, I., Elso, J. et al. 1983, MNRAS 203, 279

Wang, Q., & Wu, X. 1992, ApJS 78, 391

Warwick, R.S., Marshall, N., Fraser, G.W., et al. 1981, MNRAS 197, 865

Wheaton, W. A., Doty, J. P., Primini, F. A., et al. 1979, Nat 282, 240

White, N.E., Mason, K.O., Sanford, P.W., & Murdin, P. 1976, MNRAS 176, 201

White, N.E., Mason, K.O., & Sanford, P.W. 1977, Nat 267, 229

White, N.E., & Carpenter, G.F., 1978, MNRAS 183, 11

White, N.E., Swank, J.H., Holt, S.S., & Parmar, A.N. 1982, ApJ 263, 277

White, N.E., Mason, K.O., Giommi P., et al. 1987, MNRAS 226, 645

Whitlock, L., Roussel-Dupre, D., & Priedhorsky, W. 1989, ApJ 338, 381

Wilson, C. A., Finger, M. H., Harmon, B. A., Scott, D. M., 1997a, ApJ 479, 388

Wilson, R.B., Harmon, B.A., Scott, D.M. et al. 1997b, IAUC 6586

Wilson, C.A., & Finger, M.H. 1998, IAUC 7048, 1

Wilson, C. A., Finger, M.H. Harmon, B. A., Chakrabarty, D., & Strohmayer, T. 1998, ApJ 499, 820

Wilson, C. A., Finger, M. H., & Scott, D. M. 1999a, BAAS, 31, 714

Wilson, C. A., Finger, M. H., Scott, D. M. 1999b, ApJ 511, 367

Wilson, R. B., Harmon, B. A., & Finger, M. H. 1999, IAUC 7116, 1

Wilson, C.A., Finger, M.H., Coe, M.J., Laycock, S., Fabregat, J. 2002, ApJ 570. 387

Wilson, C. A., Finger, M. H., Coe, M. J., Negueruela, I. 2003, ApJ 584, 996

Wood, K.S., Meekins, J.F., Yentis, D.J., et al. 1984, ApJS 56, 507

Wooley, R. 1963, R. Obs. Bull. 66, 263

Yokogawa, J., & Koyama, K. 1998a, IAUC 6835, 1

Yokogawa, J., & Koyama, K. 1998b, IAUC 6853, 2

Yokogawa, J., & Koyama, K. 1998c, IAUC 7028, 1

Yokogawa, J., Imanishi, K., Tsujimoto, M., et al. 1999, PASJ 51, 547

Yokogawa, J., Imanishi, K., Tsujimoto, M., et al. 2000a, ApJS 128, 491

Yokogawa, J., Imanishi, K., Ueno, M., & Koyama, K. 2000b, PASJ 52, L73

Yokogawa, J., Torii, K., Imanishi, K., & Koyama, K. 2000c, PASJ 52, L37

Yokogawa, J., Torii, K., Kohmura, T., et al. 2000d, PASJ 52, 53

Yokogawa, J., Torii, K., Kohmura, T., & Koyama, K. 2001, PASJ 53, 227

Yokogawa, J., Imanishi, K., Tsujimoto, M., et al. 2003, PASJ 55, 151

Zebrun, K., Soszynski, I., Wozniak, P. R., et al. 2001, Acta Astron. 51, 317

Ziolkowski, J. 2002, Mem. Soc. Astron. Ital., 73, 1038 (astro-ph/0208455)

Table 1. Be/X-Ray Binaries

Name	Spec. type	m	$P_{\rm spin}$, s	$P_{\rm orb}$, d	e	d, kpc	$L_{\rm max}$ erg s^{-1}	Pulse frac., %
XTE SMC 95			95 [1]			SMC	$2 \cdot 10^{37}$ [1]	
J0032.9-7348	Be					SMC	$1.3 \cdot 10^{37}$ [2]	
J0049-732	Be?		9.1320 [3]			SMC	$4 \cdot 10^{35}$ [3]	
J0049-729	Be	16.92 [2]	74.67 [4]			SMC	$7.5 \cdot 10^{36}$ [5]	70 [5]
J0049.4-7323	Be		755.5 [6]			SMC	$5 \cdot 10^{35}$ [7]	
0050-727 (SMC X-3)	O9 V-IIIe [8]	14 [8]	92 [9]			SMC	$6 \cdot 10^{37}$ [10]	
J0050.7-7316 (DZ Tuc)	B0-B0.5 Ve [11]	15.4 [11]	323.1 [12]			SMC	$1.8 \cdot 10^{36}$ [2]	
J0051-722	Be	15 [13]	91.1 [2]			SMC	$2.9 \cdot 10^{37}$ [2]	
0051.1-7304	Be	14.28 [2]				SMC	$1.6 \cdot 10^{35}$ [2]	
J0051.8-7231	Be	13.4 [2]	8.9 [2]			SMC	$1.4 \cdot 10^{36}$ [2]	25 [14]
J0051.9-7311	Be	14.4 [2]	172.4 [15]			SMC	$4.7 \cdot 10^{35}$ [2]	
J0052-723	B0V-B1Ve [16]	15.8 [16]	4.78 [17]			SMC	$\sim 10^{38}$ [16]	
J0052.1-7319	O9.5 IIIe [18]	14.6 [18]	15.3 [2]			SMC	$1.3 \cdot 10^{37}$ [2]	
J0052.9-7158	Be	15.46 [19]	167.8 [20]			SMC	$2.0 \cdot 10^{37}$ [2]	
J0053.8-7226	Be		46.6 [2]			SMC	$7.4 \cdot 10^{36}$ [2]	25 [21]
0053-739 (SMC X-2)	B1.5 Ve [22]	16.0 [22]	2.37 [23]			SMC	$8.4 \cdot 10^{37}$ [2]	
0053+604 (γ Cas)	B0.5 IVe [24]	1.6-3.0 [25]		203.59 [26]	0.26 [26]	0.188 [27]	$3.9 \cdot 10^{34}$ [2]	
J0054.9-7226	B0-B1 III-Ve [8]	15.28 [2]	59.07 [2]	65 [28]		SMC	$3.0 \cdot 10^{37}$ [2]	
J0057.4-7325	Be?		101.45 [29]			SMC	$1.2 \cdot 10^{36}$ [30]	
J0058.2-7231	B2-3 Ve [31]	14.9 [2]				SMC	$2.1 \cdot 10^{35}$ [2]	
J0058-720	Be?		281.1 [32]			SMC	$1.6 \cdot 10^{36}$ [2]	
J0059.2-7138	B1 IIIe [8]	14.08 [2]	2.763 [2]			SMC	$5.0 \cdot 10^{37}$ [2]	37 [33]
J0101.0-7206	Be		304.49 [34]			SMC	$1.3 \cdot 10^{36}$ [2]	
J0101.3-7211	Be		455 [35]			SMC	$7.3 \cdot 10^{35}$ [36]	
J0103-722	O9-B1 III-Ve [8]	14.80 [2]	345.2 [2]			SMC	$1.5 \cdot 10^{36}$ [2]	
J0106.2-7205	B2-5 III-Ve [8]	16.7 [8]				SMC	$5 \cdot 10^{34}$ [37]	
0103-762	Be	17 [8]				SMC	$4.3 \cdot 10^{35}$ [38]	
J0105-722	Be?		3.343 [2]			SMC	$1.5 \cdot 10^{35}$ [2]	
J0111.2-7317	B0.5-B1Ve [18]	15.4 [18]	31.03 [2]			SMC	$2.0 \cdot 10^{38}$ [2]	45 [18]
0115+634	B0.2 Ve [39]	15.5 [39]	3.6 [2]	24.3 [39]	0.34 [39]	7-8 [39]	$3.0 \cdot 10^{37}$ [2]	40-60 [70]
J0117.6-7330	B0.5 IIIe [40]	14.2 [2]	22.07 [2]			SMC	$1.2 \cdot 10^{38}$ [2]	11.3 [41]
J0146.9+6121 (V831 Cas)	B1 III-Ve [42]	11.2 [42]	1412 [2]			2.5 [2]	$3.5 \cdot 10^{35}$ [2]	
0236+610 (V615 Cas)	B0.5 Ve [43]	10.7 [8]		26.45 [8]		3.1 [2]	$2 \cdot 10^{34}$ [2]	
0331+530 (BQ Cam)	O8-9 Ve [44]	15.7 [44]	4.4 [2]	34.3 [44]	0.3 [44]	7 [44]	$\gtrsim 10^{38}$ [44]	
0352+309 (X Per)	O9.5 IIIe -B0 Ve [45]	6.1-6.8 [45]	837 [45]	250 [45]	0.11[45]	1.3 [45]	$3 \cdot 10^{35}$ [45]	
J0440.9+4431	B0 III-Ve [36]	10.78 [36]	203 [2]			3.2 [2]	$3 \cdot 10^{34}$ [2]	
J0501.6-7034	B0 Ve [46]	14.5 [46]				LMC	$7 \cdot 10^{34}$ [46]	
J0502.9-6626	B0 Ve [46]	14.3 [46]	4.1 [46]			LMC	$4 \cdot 10^{37}$ [46]	
J0516.0-6916	B1 V [46] Be [76]	15.0 [8]				LMC	$5 \cdot 10^{35}$ [8]	
J0520.5-6932	O9 Ve [46]	14.4 [8]		24.4 [77]		LMC	$8 \cdot 10^{38}$ [77]	
J0529.8-6556	B0.5 Ve [4]		69.5 [47]			LMC	$2 \cdot 10^{36}$ [47]	
053109-6609.2	B0.7 Ve [46]		13.7 [46]	24.5 [46]		LMC	$1 \cdot 10^{37}$ [47]	54-78 [47]
J0531.5-6518	B2 Ve [46]	16.02 [46]				LMC	$3 \cdot 10^{35}$ [46]	
J0535.0-6700	B0 Ve [46]	14.87 [46]				LMC	$3 \cdot 10^{35}$ [46]	
0535-668	B0.5 IIIe [46]	12.3-14.9 [8]	0.068 [8]	16.7 [8]	> 0.5 [24]	LMC	$1 \cdot 10^{39}$ [46]	

Table 2. Be/X-Ray Binaries (continue)

Name	Spectral type	m	P_{spin}, s	P_{orb}, d	e	d, kpc	L_{max}	Pulse frac., %
0535+262 (V725 Tau)	B0 IIIe [48]	8.9-9.6 [8]	105 [2]	111 [8]	0.47 [24]	2.4 [2]	$2 \cdot 10^{37}$ [2]	20-100 [49], [50]
0544-665	B0 Ve [46]	15.55 [46]				LMC	$1 \cdot 10^{37}$ [46]	
0544.1-710	B0 Ve [46]	15.25 [46]	96.08 [46]			LMC	$2 \cdot 10^{36}$ [46]	
0556+286	B5ne [8]	9.2 [8]						
J0635+0533	B2V-B1IIIe [8]	12.83 [8]	0.0338 [8]			2.5 – 5 [59]	(9-35) $\cdot 10^{33}$ [59]	~20 [60]
0726-260	O8-9Ve [8]	11.6 [8]	103.2 [8]	34.5 [8]		~6 [62]	$2.8 \cdot 10^{35}$ [62]	~ 30 [62]
0739-529	B7 IV-Ve [8]	7.62 [8]						
0749-600	B8 IIIe [8]	6.73 [8]						
J0812.4-3114	B0.5 V-IIIe [8]	12.42 [8]	31.89 [8]	80 [68]		9 [69]	$1.1 \cdot 10^{36}$ [69]	
0834-430	B0-2 III-Ve [8]	20.4 [8]	12.3 [8]	105.8 [24]	0.12 [24]	5 [2]	$1.1 \cdot 10^{37}$[2]	<15 [55]
J1008-57	O9e-B1e [24]	15.27 [8]	93.5 [8]	247.5 [24]	0.66 [24]	2 [2]	$2.9 \cdot 10^{35}$ [2]	60 [56]
1036-565	B4 IIIe [8]	6.64 [8]						
J1037.5-5647	B0V-IIIe [8]	11.3 [8]	862 [8]			5 [2]	$4.5 \cdot 10^{35}$ [2]	52 [57]
1118-615	O9.5 V-IIIe [8]	12.1 [8]	405 [8]			5 [2]	$5 \cdot 10^{36}$ [2]	
1145-619	B0.2 IIIe [24]	9.3 [8]	292.4 [8]	187.5 [8]	>0.5 [24]	0.5 [2]	$7.4 \cdot 10^{34}$ [2]	28-70 [58]
1249-637	B0 IIIe [8]	5.31 [8]						
1253-761	B7 Vne [8]	6.49 [8]						
1255-567	B5 Ve [8]	5.17[8]						
1258-613 (GX 304-1)	B2 Vne [8]	13.5 [8]	272 [8]	132.5 [24]	>0.5 [24]	2.4 [2]	$1 \cdot 10^{36}$ [2]	
1417-624	B1 Ve [24]	17.2 [8]	17.6 [8]	42.12 [8]	0.446 [24]	10 [2]	$8 \cdot 10^{36}$ [2]	
J1452.8-5949			437.4 [8]			9 [2]	$8.7 \cdot 10^{33}$ [2]	50-100 [71]
J1543-568	B0.7 Ve [24]		27.1 [24]	75.6 [63]	<0.03 [63]	> 10 [63]	> 10^{37} [63]	60-70 [63]
1553-542	Be?		9.26 [24]	30.6 [8]	<0.09 [24]	10 [2]	$7 \cdot 10^{36}$ [2]	30 [72]
1555-552	B2nne [8]	8.6 [8]						
J170006-4157			714.5 [8]			10 [2]	$7.2 \cdot 10^{34}$ [2]	~ 30 [73]
J1739-302						8.5 [74]	$4.2 \cdot 10^{37}$ [74]	
J1739.4-2942	Be?							
J1744.7-2713	B2 V-IIIe [8]	8.4 [8]					~ 10^{32} [75]	
J1749.2-2725	Be?		220.38 [8]			8.5 [2,78]	$2.6 \cdot 10^{35}$ [2,78]	
J1750-27			4.45[8]	29.8 [8]				
J1820.5-1434	O9.5-B0Ve [80]		152.26 [9]			4.7 [2]	$9 \cdot 10^{34}$ [2]	33 [54]
1843+00	B0-B2 IV-Ve [65]	20.9 [65]	29.5 [8]			> 10 [65]	$3 \cdot 10^{37}$ [67]	7 [66]
1845-024			94.8 [8]	242.18 [24]	0.88 [8]	10 [2]	$6 \cdot 10^{36}$ [2]	
J1858+034			221 [8]					25 [53]
1936+541	Be [8]	9.8 [8]						
J1946+274	B0-B1 IV-Ve [64]	18.6 [64]	15.8 [8]	169.2 [64]	0.33 [64]	5 [2]	$5.4 \cdot 10^{36}$ [2]	30 [52]
J1948+32	B0e [24]		18.76 [24]	41.7 [24]	<0.25 [24]			
2030+375	B0e [24]	19.7 [8]	41.8 [24]	46.03 [8]	0.41 [24]	5 [2]	$1 \cdot 10^{38}$ [2]	36 [70]
J2030.5+4751	B0.5 V-IIIe [8]					2.2 [8]		
J2058+42	Be? [8]		198 [8]	110 [8]		7 [2]	$2 \cdot 10^{36}$ [2]	36 [70]
2103.5+4545	B0Ve[79]	14.2 [79]	358.6 [79]	12.7 [79]	~ 0.4 [79]	6.5 [79]	$3 \cdot 10^{36}$ [79]	
2138+568 (Cep X-4)	B1V-B2Ve [61]	14.2 [61]	66.3 [24]			3.8 [2]	$9.1 \cdot 10^{35}$ [2]	5-85 [61]
2206+543	B1e [8]	9.9 [8]	392 [8]	9.57 [24]		2.5 [2]	$2.5 \cdot 10^{35}$ [2]	
2214+589	Be [8]	11 [8]						
J2239.3+6116	B0 V - B2 IIIe [8]	15.1 [8]	1247 [51]	262.6 [24]		4.4 [8]	~ $2.3 \cdot 10^{36}$ [51]	40 [51]